Missouri

Senior Food Insecurity Report

2018

Letter from the State Unit on Aging Director

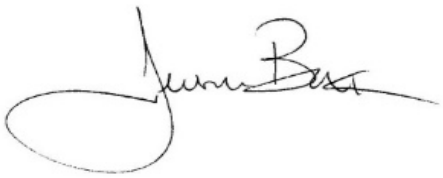
Why are as many as one in eight seniors in Missouri struggling from day to day to have enough to eat?

As the Director of the Division of Senior and Disability Services within the Department of Health and Senior Services, I believe Missouri seniors should not suffer the indignity of inadequate access to nutritious food. Many community organizations already provide critical access to nutrition programs for Missouri seniors, including the home-delivered and congregate meal programs provided by our Missouri Area Agencies on Aging, as well as foodbanks or local givers that supply pantries that would otherwise remain bare.

Our goal in writing the Senior Food Insecurity Report was to: 1) enumerate the trade-offs seniors often make that ultimately result in inadequate access to food, 2) identify the costs associated with poorer health as a result of nutritional insufficiency, and 3) explain the impacts to our State when our seniors' health fails from an inadequate or nutritionally deficient diet. I believe through the examination of these elements, we have surveyed the landscape of senior food insecurity in Missouri, resulting in a clearer picture of what many seniors face.

My hope is that you will join me and the rest of the Missouri aging service network to augment all aspects of nutritional access to ensure seniors in Missouri always get the food they need to live healthy and productive lives. Together we can inform seniors of existing resources to improve their access to healthy food, and lead in the development of fact-focused, scalable solutions that ensure no senior will ever again have to wonder when they will eat next.

Sincerely,



Jessica Bax, Director
Division of Senior and Disability Services
Department of Health and Senior Services

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Abbreviations

AAA:	Area Agency on Aging
ADL:	Activities of Daily Living
BMI:	Body Mass Index
CACFP:	Child and Adult Care Food Program
CFSM:	Core Food Security Module
CPS:	Current Population Survey
CSFP:	Commodity Supplemental Food Program
EBT:	Electronic Benefit Transfer
ER:	Emergency Room
ERS:	Economic Research Service
ESAP:	Elderly Simplified Application Project
FSS:	Food Security Supplement
HFSSM:	Household Food Security Survey Module
MNA:	Mini Nutritional Assessment
MNA-SF:	Mini Nutritional Assessment Short Form
MST:	Malnutrition Screening Tool
MUST:	Malnutrition Universal Screening Tool
NFCSP:	National Family Caregiver Support Program
NFESH:	National Foundation to End Senior Hunger
NRS-2002:	Nutrition Risk Screening 2002
NSBLP:	National School Breakfast and Lunch Program
OAA:	Older Americans Act
SCSEP:	Senior Community Service Employment Program
SFMNP:	Senior Farmers' Market Nutrition Program
SNAP:	Supplemental Nutrition Assistance Program
SNAQ:	Short Nutrition Assessment Questionnaire
SSI:	Supplemental Security Income
TANF:	Temporary Assistance for Needy Families
TEFAP:	The Emergency Food Assistance Program
USDA:	United States Department of Agriculture
WIC:	Women, Infants, and Children

Executive Summary

Hunger is a serious threat facing millions of seniors in the United States. The percentage of older adults facing the threat of hunger is also known as the rate of senior food insecurity.[1] Estimates indicate that one in eight Missouri seniors struggled with food insecurity in 2015 (see Figure 1).[2] Of the more than 1.3 million seniors in Missouri in 2015, roughly 170,000 grappled with not having regular access to food.

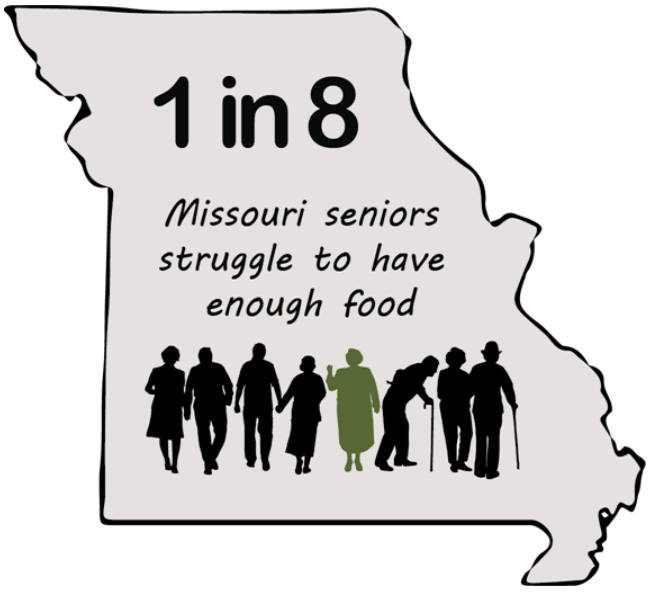


Figure 1. The rate of senior hunger in Missouri. Recent estimates indicate that 1 in 8 Missouri seniors struggled with hunger in 2015.[2]

This report illuminates the prevalence of senior food insecurity and encourages community members, health professionals, public officials, and decision makers at all levels to come together and take a deeper look at the causes of senior hunger by highlighting potential solutions to address the growing prevalence of senior food insecurity.

The 2018 Missouri Senior Hunger Report features:

- *The Landscape of Senior Food Insecurity*: A synopsis of the overall key findings;
- *Measurement*: A summary of how food insecurity is measured in the U.S.;
- *Frequency*: A review of the prevalence of senior food insecurity at the national and statewide level;
- *Common Predictors*: A description of the factors that contribute to increased risk of food insecurity;
- *Impact*: A discussion of the poor nutrition and health outcomes associated with food insecurity;
- *Strategies and Trade-offs*: An overview of the continual spending decisions that food insecure seniors often encounter;
- *Food Assistance*: An outline of the public and private nutritional assistance programs currently available to Missouri seniors;
- *Opportunities*: A list of proposed actions to help alleviate local senior food insecurity.

Service and support gaps that contribute to senior food insecurity are explored in this report. The opportunities section suggests the following five areas for improvements in senior food security:

1. Improvements to Federal and State Assistance Programs:
    - Explore options to enhance the availability of SNAP
    - Increase SNAP awareness and participation among seniors
    - Expand access to the Commodity Supplemental Food Program
2. Nutritional Enhancements:
    - Improve food and nutrition screening
    - Provide meals after hospital discharge
    - Improve fresh produce intake
    - Minimize plate waste
3. Community Development
4. Improvements to Related Services:
    - Improve geriatric dental care
    - Promote aging-at-home initiatives
    - Educate seniors raising grandchildren
    - Improve economic opportunity for seniors
5. Create Awareness:
    - Provide senior food insecurity education
    - Spread awareness of the problem

The Landscape

Adults age 60 and older comprised 22 percent of the U.S. population in 2016.[3] According to the Administration for Community Living, this demographic has increased by 30 percent between 2005 and 2016 and is expected to grow by an additional 22 percent by 2040.[4] Over the next decade, this expanding demographic is expected to have a higher prevalence of obesity and diabetes and a declining prevalence of high health status.[5] These changing demographics will have profound impacts on health care systems and drive the demand for expanded community-centered programs that meet each individual's unique needs to avoid much more costly institutional long-term care. Pressures for specialized health care and increased services will be compounded by the unique nutritional needs and challenges that differentiate seniors from the general population.

A high percentage of seniors today are struggling with regular access to adequate nutrition, also known as food insecurity.[6] Senior food insecurity refers to the proportion of adults aged 60 or older with reduced food intake and/or disrupted eating patterns due to lack of resources for food.[2] Recent estimates indicate 12.85 percent of Missouri seniors struggled with food insecurity in 2017.[2]

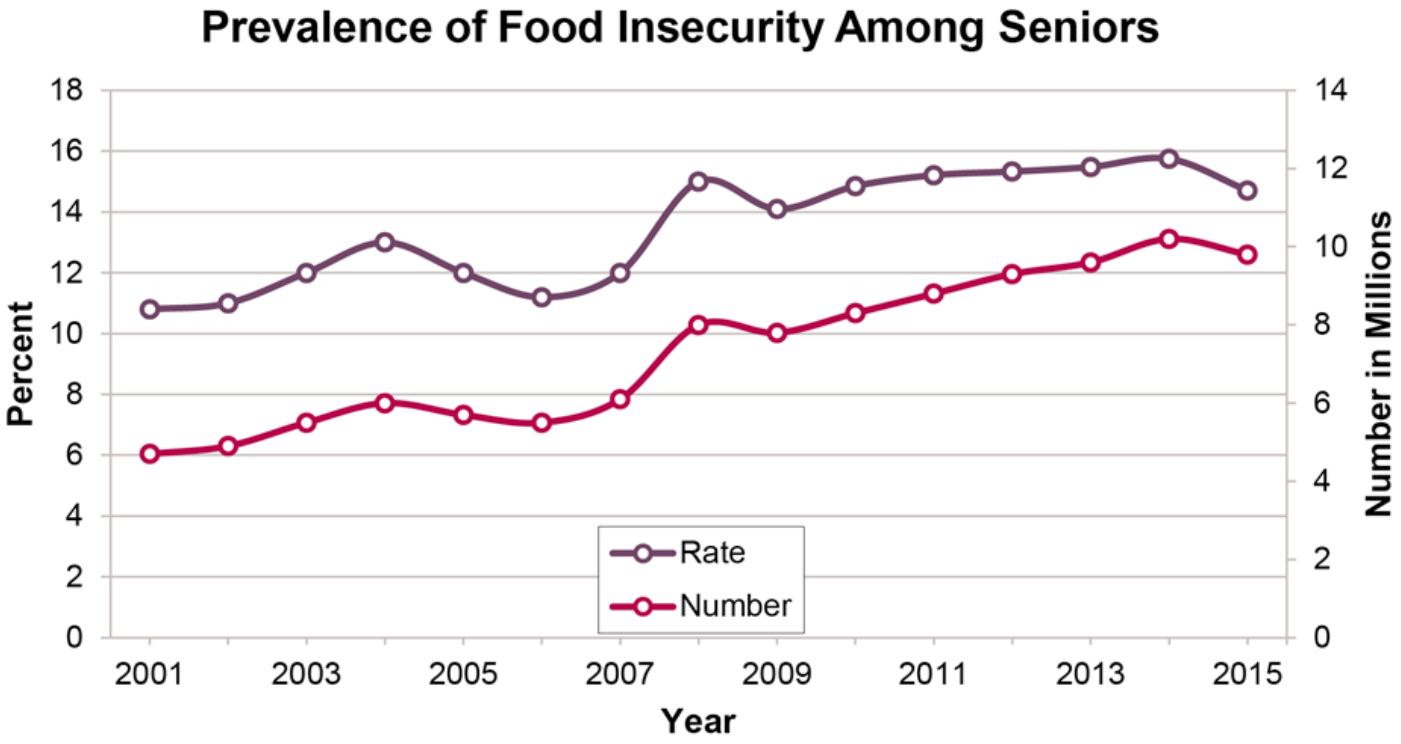


Figure 2. The prevalence of food insecurity among seniors in the US. The prevalence of marginal food insecurity in the senior population is expressed in purple as the percentage of seniors (left-hand axis) and is expressed in red as the number of seniors in millions (right-hand axis) from 2001-2015. Household marginal food insecurity is defined as having problems or anxiety, at times, about accessing adequate food, without the need to substantially alter quantity of food intake or disrupt normal eating patterns.[7] Up until the most recent report, the prevalence rate and the number of seniors facing marginal food insecurity had been steadily increasing over the past few years. Figure adapted from National Foundation to End Senior Hunger (2017).[2,8]

National household food security is measured and reported each year by the U.S. Department of Agriculture (USDA).[1] Recent trends indicate that food insecurity is growing steadily across the nation (see Figure 2).[2,8] National rates of household food insecurity in all populations rose markedly during the 2007-2009 recession, and although the prevalence has declined since then, it remains higher than the pre-recession level for all households. However, the percentage of Americans aged 60 years and older facing the threat of hunger has increased dramatically since 2001, with Missouri rates projected to rise by an additional 41 percent by 2030.[5] Senior food insecurity has not been this prevalent since the War on Poverty in the 1960s.[9]

What are the Common Causes of Food Insecurity?

Overall, the data suggests that seniors living at home are at an increased risk of hunger compared with younger adults due to health conditions, disability, and functional limitations that impact their ability to obtain and/or prepare food. By far, the largest contributor to a senior's inability to obtain reliable adequate nutrition is poverty. Research has shown that seniors are more likely to be at-risk of hunger if they live at or below the poverty line.[2] Poor food management skills, lack of reliable social support, and inadequate access to transportation also contribute to an elevated risk of food insecurity.[6] Furthermore, for many older adults, a low fixed income can be compounded with physical limitations and one or more chronic diseases that impact older adults' abilities to shop for, prepare, and eat nutritious meals.

How Does Food Insecurity Affect Seniors?

Food insecurity is associated with a host of poor nutritional and health outcomes in seniors. One notable finding is that food insecure seniors not only consume fewer nutrients, but they are also at an increased risk for chronic health conditions such as diabetes, depression, heart attack, gum disease, asthma, and congestive heart failure (see Figure 3).[2,10] With the influx of cheap high-calorie, low-nutrient foods, food insecurity and malnutrition can be more difficult to recognize because it can be masked by an individual's obesity, leading a practitioner to believe that behavior is the root cause of insufficient nutrition, not food insecurity. Oftentimes household food insecurity is not a "progressive" issue like some chronic diseases, but can be experienced both chronically and cyclically, making it more difficult to recognize.[11]

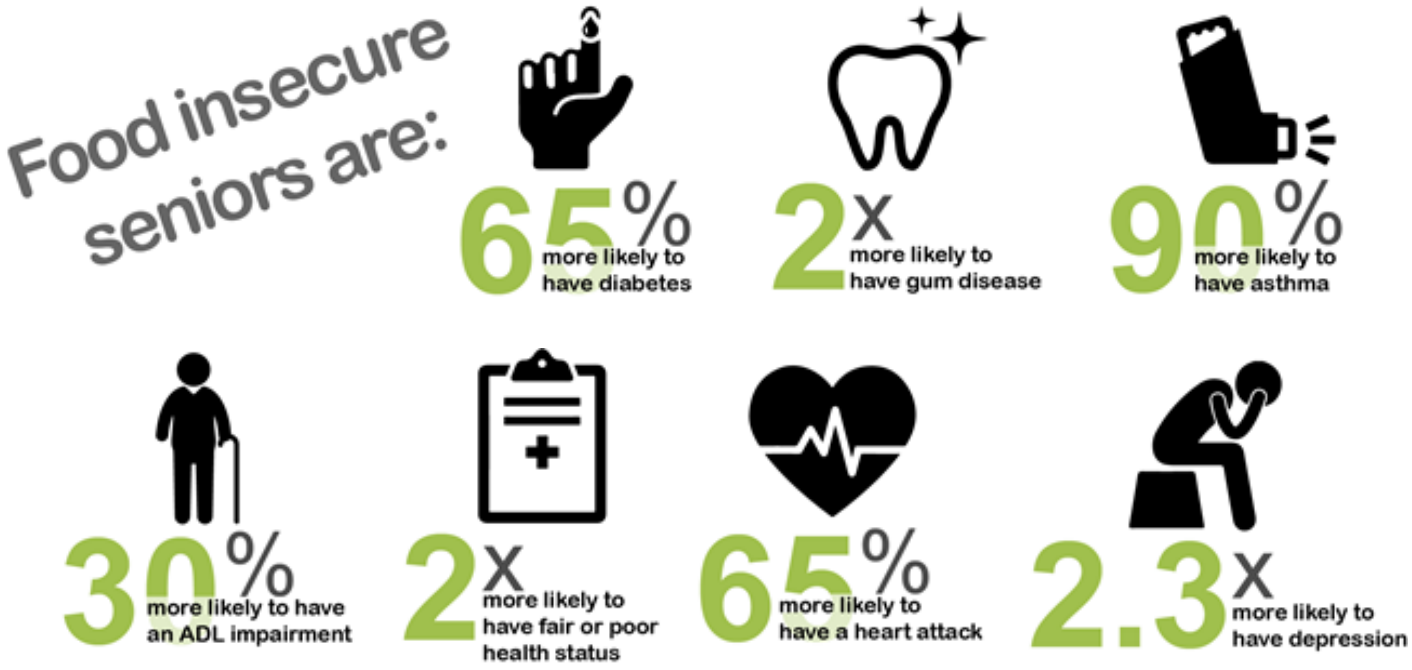


Figure 3. Adverse health consequences associated with food insecurity in seniors. Food insecure older adults are more likely to have adverse health consequences than other age groups. Figure adapted from Meals on Wheels (2017)[10] using calculations from the National Foundation to End Senior Hunger (2017).[2]

In addition to increased risk of malnutrition and chronic disease, food insecurity is also a strong predictor of increased health care needs and utilization costs. Food insecure seniors have more doctors' visits, emergency room visits, and more frequent hospitalizations than food secure seniors.[12] Food insecurity has a negative impact on medication compliance and worsens psychological well-being, both of which are often overlooked as contributory factors for worsening health outcomes for seniors. Overall, food insecurity is associated with increased medical costs for both the individual senior as well as the overall health care system, and these costs are likely to remain increased as long as a senior remains food insecure.

How Do Seniors Cope With Food Insecurity?

Older adults who are food insecure are faced with continual spending decisions and trade-offs driven by limited financial resources. Many individuals choose between paying for food or paying for utilities, transportation, medication, and housing.[13] Older adults frequently cope by buying the cheapest food available that typically has little or no nutritional value, watering down food and drinks, and even selling or pawning personal items to stretch their limited budget.[10] Many of the strategies older adults use to cope with food insecurity can also exacerbate existing health conditions.

Many older Americans turn to public and private nutritional assistance programs in times of need. These programs increase the amount of nutritious food available to food insecure households and are one of the most effective ways to ensure eligible older adults access healthy foods. However, these nutrition programs and other supplementary federal benefits are largely underutilized by seniors. Only 42 percent of all seniors in the U.S. who qualify for the Supplemental Nutrition Assistance Program (SNAP), still commonly known as Food Stamps in Missouri, participate in the program.[14] A survey of mid-Missouri senior food pantry users found that 63 percent of respondents reported never using SNAP as a food resource, while 88 percent reported never using Meals on Wheels or other senior nutrition programs as a food resource.[15] These local findings suggest that the majority of Missouri's food insecure older adults, whether because of lack of awareness or by choice, are not accessing the food resources available to them.

Measurement

Defining Food Insecurity

The Economic Research Service (ERS)[1] of the USDA defines food security as "access by all people at all times to enough food for an active, healthy life." Food insecurity exists whenever the availability of nutritionally adequate and safe foods or the ability to acquire acceptable foods in socially acceptable ways is limited or uncertain.[16] The USDA measures food insecurity as a household-level concept that refers to uncertain, insufficient, or unacceptable availability, access, or utilization of food.[16] Each December, the USDA's food security scale measures the severity of food insecurity in surveyed households to classify household food security status for the previous year. The safety and nutritional quality of food and the prevalence of hunger at the household and individual levels are also important factors to consider, but these dimensions are not measured by this scale.[16]

How is Food Security Measured in the U.S.?

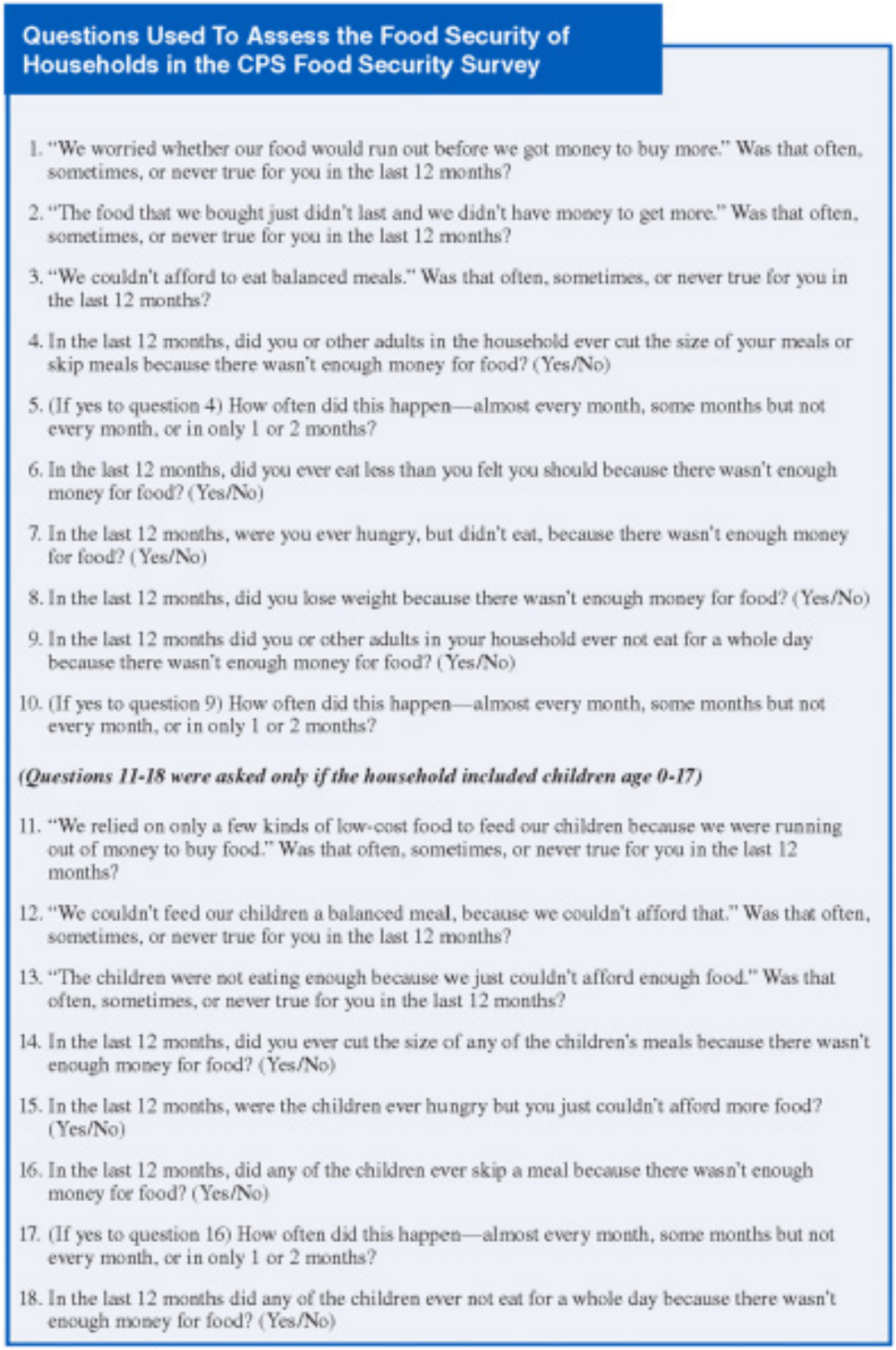
Beginning in 1996, national food security has been measured by the Food Security Supplement (FSS) as part of the Current Population Survey (CPS) that is administered by the U.S. Census Bureau for the Bureau of Labor Statistics. The survey has since been modified and is currently referred to as the Core Food Security Module (CFSM) or the Household Food Security Survey Module (HFSSM). The primary objectives of the annual food security measure are to monitor the estimated prevalence of food insecurity and changes in the prevalence over time at the national and state levels.[16]

Each December 45,000 households nationwide respond to CFSM questions about food spending and the use of government and community food assistance programs. The CFSM contains 18 questions for households with children (age 0-17) and 10 questions for childless households. It asks respondents to assess their food insecurity experiences over the last 12 months and provides prompts asking how each experience occurred. Each CFSM question is qualified by the prerequisite that the reduced food intakes were caused specifically by financial constraints and not due to dieting, religious fasting, or being too busy to eat.[17] Though lack of economic resources is the most common cause of food insecurity, the problem can also be experienced when food is available and accessible but cannot be prepared and eaten because of physical difficulties or other constraints, such as limited physical functioning by elderly people or those with disabilities.[18] As a result, food insecurity, as currently measured by the CPS, may be underestimated in such populations. Advantages and disadvantages of CPS shortcomings are discussed in the Appendix of this report.

Based on responses to the CFSM questions, the USDA classifies households into four food security categories: high food security (formerly known as food security), marginal food security (also referred to as the threat of hunger), low food security (also referred to as the risk of hunger), and very low food security (also referred to as facing hunger).[2] The USDA[7] defines these terms as follows:

1. High food security — Household had no problems or anxiety about consistently accessing adequate food.
2. Marginal food security — Household, at times, had problems or anxiety about accessing adequate food, but the quality, variety, and quantity of their food intake were not substantially reduced.
3. Low food security — Household reduced the quality, variety, and desirability of their diets, but the quantity of food intake and normal eating patterns were not substantially disrupted.
4. Very low food security — At times during the year, eating patterns of one or more household members were disrupted and food intake reduced because the household lacked money and other resources for food.

Households or individuals are considered fully food secure if questions are not answered in the affirmative. Individuals or households are considered marginally food secure if one or two questions are answered in the affirmative. The individual or household is considered food insecure if three to five questions are answered in the affirmative in childless households or three to seven questions in households with children. The individual or household is considered very low in food security if six or more questions are answered in the affirmative in childless households or eight or more in households with children.[2] For the latest questions see Figure 4 on the next page.



Questions Used To Assess the Food Security of Households in the CPS Food Security Survey

1. "We worried whether our food would run out before we got money to buy more." Was that often, sometimes, or never true for you in the last 12 months?
2. "The food that we bought just didn't last and we didn't have money to get more." Was that often, sometimes, or never true for you in the last 12 months?
3. "We couldn't afford to eat balanced meals." Was that often, sometimes, or never true for you in the last 12 months?
4. In the last 12 months, did you or other adults in the household ever cut the size of your meals or skip meals because there wasn't enough money for food? (Yes/No)
5. (If yes to question 4) How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?
6. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food? (Yes/No)
7. In the last 12 months, were you ever hungry, but didn't eat, because there wasn't enough money for food? (Yes/No)
8. In the last 12 months, did you lose weight because there wasn't enough money for food? (Yes/No)
9. In the last 12 months did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food? (Yes/No)
10. (If yes to question 9) How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?

(Questions 11-18 were asked only if the household included children age 0-17)

11. "We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food." Was that often, sometimes, or never true for you in the last 12 months?
12. "We couldn't feed our children a balanced meal, because we couldn't afford that." Was that often, sometimes, or never true for you in the last 12 months?
13. "The children were not eating enough because we just couldn't afford enough food." Was that often, sometimes, or never true for you in the last 12 months?
14. In the last 12 months, did you ever cut the size of any of the children's meals because there wasn't enough money for food? (Yes/No)
15. In the last 12 months, were the children ever hungry but you just couldn't afford more food? (Yes/No)
16. In the last 12 months, did any of the children ever skip a meal because there wasn't enough money for food? (Yes/No)
17. (If yes to question 16) How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?
18. In the last 12 months did any of the children ever not eat for a whole day because there wasn't enough money for food? (Yes/No)

Figure 4. Questions used to assess the food security status of households in the CPS Food Security Survey. Food security is calculated for each surveyed household based on responses to a series of questions about conditions and behaviors that characterize households when they are having difficulty meeting basic food needs. The survey includes three questions about food conditions of the household as a whole and seven about food conditions of adults in the household and, if there are children present in the household, an additional eight questions about their food conditions. Figure from Coleman-Jensen and colleagues (2017).[1]

Frequency

In 2015, Missouri ranked 18th at 12.85 percent among states in senior food insecurity according to the National Foundation to End Senior Hunger's (NFESH) most recent report.[2] This ranking significantly improved from 38th in 2014 when the rate was 16.61 percent[19] and 44th in 2013 when the rate was 19.06 percent[20] (see Figure 5). This year's ranking also represents the first time that Missouri's senior food insecurity rate dropped below the national average rate (14.7 percent in 2015) since the inception of these reports.

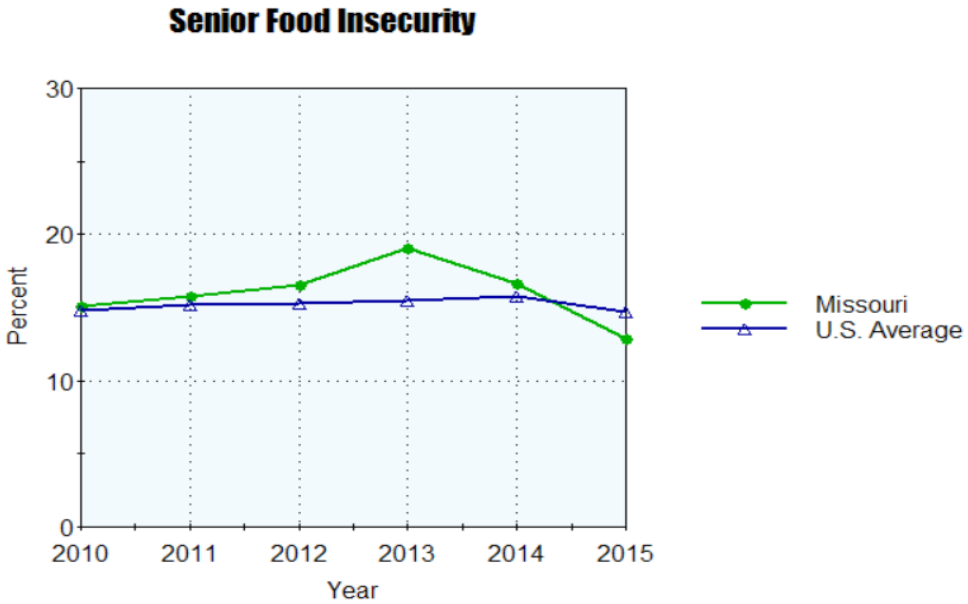


Figure 5. *The prevalence of food insecurity in Missouri compared with the national average from 2009-2015.* Each year except for the most recent, the rate of food insecurity has been higher in Missouri (shown in green) than the national average (shown in blue), with a noticeable spike in 2012-2013. Figure adapted using values from the annual State of Senior Hunger reports, 2011-2017.[2,19-23]

To put these values into context, adults aged 60 and older accounted for 22 percent of Missouri's overall population in 2015, representing more than 1.3 million individuals.[3] This data implies there were more than 170,000 food insecure seniors in Missouri in 2015. Although the estimated number of Missouri individuals facing the threat of food insecurity declined in the most recent report, these trends indicate a large number of older Missourians have inconsistent access to food and that an even greater proportion are unable to meet their nutrition needs through existing acquisition strategies.

Missouri is in the lowest quartile when it comes to health determinants that affect the well-being of seniors. Based on 34 measures of senior health, America's Health Rankings' 2017 Senior Report ranked Missouri 42nd among states,[6] which is a drop from 40th among states in 2016.[5] Although the state's overall ranking dropped, the report highlighted the state's strong Older Americans Act home-delivered meal performance, which ranked 9th among states in 2017 and 10th in 2016. The 2017 study, which reported that the number of meals served as a percentage of seniors aged 60 years and older with independent-living difficulty in Missouri, showed 22 percent of senior Missourians had meals funded by the Older Americans Act delivered to them, compared to the national average of 10 percent.[6] The 2016 study found that 37 percent of senior Missourians had meals delivered to them, compared to the national average of 19 percent.[5] The considerable reach of this program highlights the achievement of one of the state's initiatives to alleviate food insecurity in its senior population.

Common Predictors

Household Income

Seniors are more likely to be at-risk of hunger if they live at or below the poverty line (see Figure 6). United States Census data show approximately 4.6 million, or 9 percent, of seniors lived below the poverty line in 2016,[24] indicating a large at-risk population. However, it is important to emphasize that the risk of hunger transcends income and wealth distributions and is present in all socioeconomic and demographic groups.[17] For seniors, this may stem from limited access to food, inability to prepare food, or mobility restrictions. The majority of seniors facing food insecurity have an income above the poverty level (see Figure 7).[2,10] Consequently, millions of food insecure households in the United States have sufficiently high incomes to render them ineligible for food assistance programs, yet cannot secure adequate food resources.[25] Hence, further research is needed to identify the characteristics that would likely indicate food insecurity among middle-income households in order to draft policy aimed at reducing food insecurity.

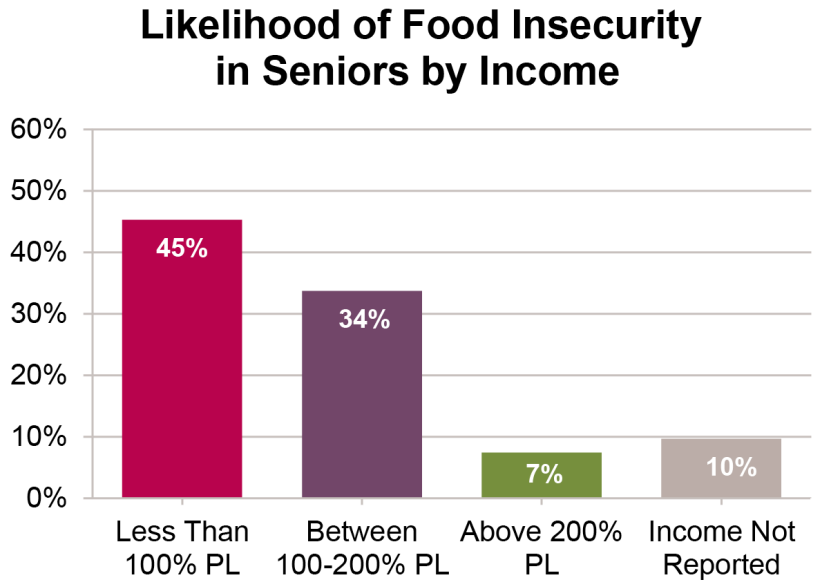


Figure 6. The prevalence of food insecurity among the senior population across reported income levels. Seniors who live at or below the federal poverty level are more likely to be marginally food insecure than those living above the poverty level. Figure produced using calculations from the National Foundation to End Senior Hunger (2017).[2]

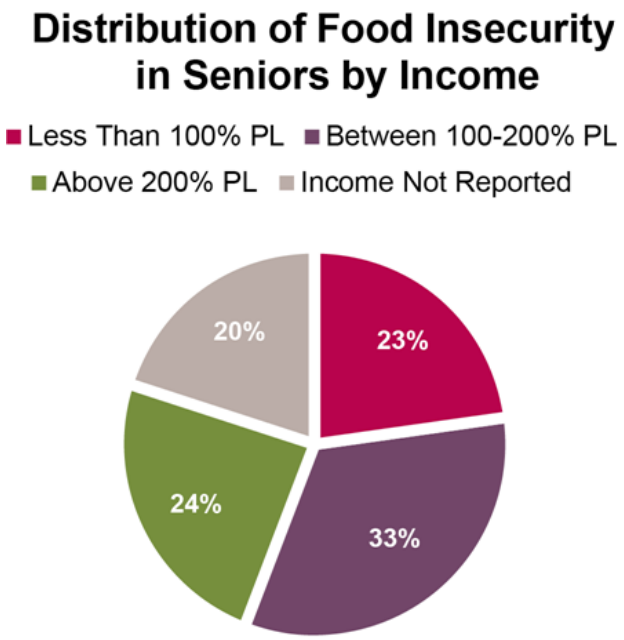


Figure 7. The distribution of food insecurity among surveyed seniors across reported income levels. Over 57 percent of marginally food insecure seniors reported having incomes over the federal poverty level. Figure produced using calculations from the National Foundation to End Senior Hunger (2017)[2]

Poverty status is a clear predictor of hunger and research has found that households facing the most extreme level of poverty (incomes below 50 percent of the poverty line) experience the highest rates of hunger.[17] Along with poverty level it is important to consider the resources available to a household. Although poverty is an important predictor of senior food insecurity, characteristics such as being white, married without grandchildren in the home, employed or retired, well-educated, and owning one's home, can meaningfully buffer the effect of poverty and these characteristics in combination can reduce the probability of experiencing low food security to almost zero.[17] This finding may explain why not all low-income households experience food insecurity.

Food insecurity is by no means restricted to the poor. Based on Gundersen, Kreider, and Pepper's[25] interpretations, the probability of food insecurity in the general population declines with income and the reduction is more drastic for low food insecurity and marginal food insecurity than for very low food security. According to Gundersen and colleagues,[25] a high proportion of households exist that are food secure and below the poverty line as well as a large number of households above the poverty line that are food insecure (see Figure 8). Based on the 2001-2005 CPS data, over 50 percent of all seniors who were at-risk of hunger had incomes above the poverty line, and nearly one-fourth had a net worth exceeding $50,000.[17] Similar trends were observed in the most recent report,[2] as was shown in Figure 8. These observations shed light on how food insecurity can affect people of all demographic backgrounds.

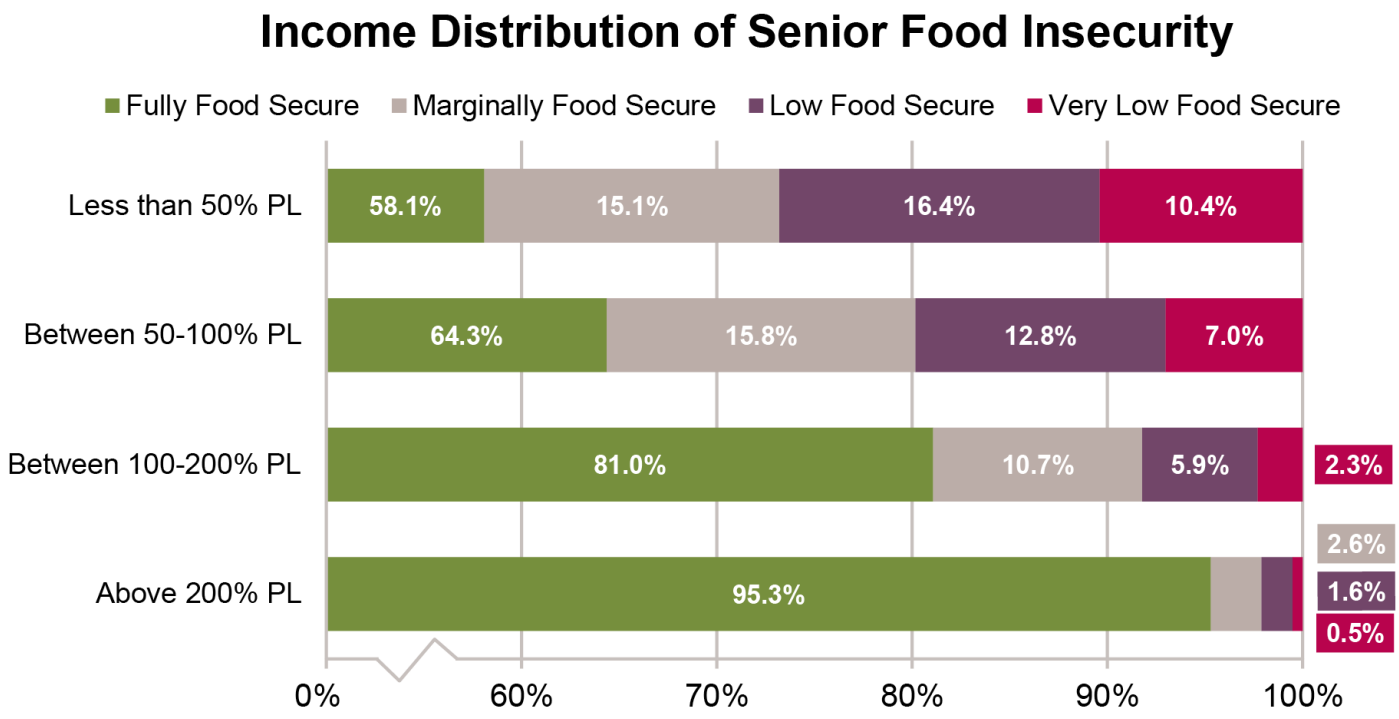


Figure 8. The distribution of food insecurity for elderly households using data from the 2001-2005 CPS. Households facing the most extreme poverty (incomes below 50 percent of the federal poverty level) experience the highest rates of hunger. However, it is also notable that the majority of households below 50 percent of the poverty level report being fully food secure and that some households with incomes above the poverty level report being food insecure. Figure adapted from data provided in Ziliak, Gundersen, and Haist (2008).[17]

Several explanations can help decipher these counterintuitive trends. The primary interpretation for why higher-income households may report food insecurity is that current income as measured by the CPS does not adequately predict the ability of families to avoid food insecurity. Gundersen and Gruber[26] found that average household income over a two-year period is a better and more stable predictor of whether a household is food insecure than current income, which the CPS uses. Another explanation for these findings is that certain factors relating to food insecurity, such as liquid financial assets, are not measured or taken into account by the CPS. Gundersen and Gruber[26] found that households without liquid assets are substantially more likely to be food insecure than those with liquid assets. Thus, high incomes reduce the probability of food insecurity, but having access to assets has a strong and statistically significant effect in reducing food insecurity as well. Furthermore, income volatility[27] and negative income shocks[28] also lead to increased probabilities of food insecurity. However, the influence of these latter factors is lessened for seniors, given that most live on fixed incomes. Steady fixed income and the increasing access to nutrition programs and Social Security benefits with age may explain why rates of food insecurity decrease with increasing age in older adult populations (see Figure 9).[29]

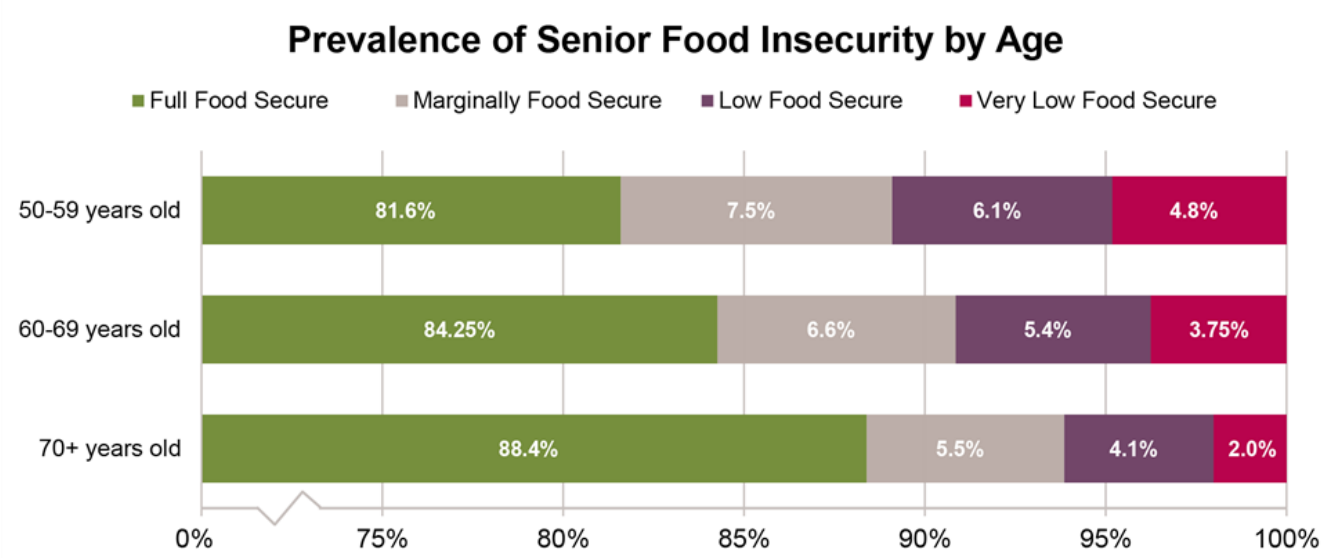
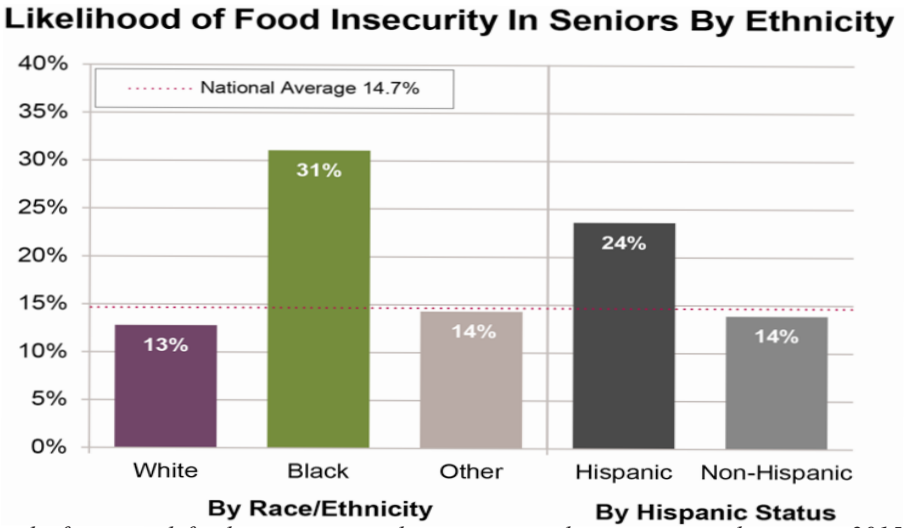


Figure 9. The prevalence of senior food insecurity by age group. Findings show that rates of food insecurity decline with older age in older adults. Figure produced using values from Strickhouser, Wright, & Donley (2014).[29]

Demographic Predictors

Research shows seniors are more likely to be food insecure if they have a disability, live in a southern state, are African American or Hispanic/Latino, are low-income or less educated, live alone, are raising a grandchild, or are under 70 years old.[17] Older Americans are disproportionately affected by food insecurity due to limited incomes and poor health status, which can be exacerbated by an inadequate diet. Employment status also has an effect on whether or not seniors will face the threat of hunger. Retired seniors are more likely than employed or disabled seniors to face the threat of hunger.[2] One notable finding is that while African-Americans and Hispanics/Latinos seniors are at a higher risk for food insecurity than Whites (see Figure 10), 73 percent of those who are food insecure were white in the U.S. compared to 21 percent who were black or 6 percent of all other races (see Figure 11).



F*igure 10. The likelihood of marginal food insecurity in the senior population across ethnicity in 2015.* Marginal food insecurity impacts certain subpopulations at a disproportionate rate, such that in 2015, 31 percent of African-American households and 24 percent of Hispanic households experienced marginal food insecurity. The likelihood of food insecurity for both of these populations was substantially higher than that of the national average of 14.7 percent (dotted red line). Figure produced using calculations from the National Foundation to End Senior Hunger (2017).[2]

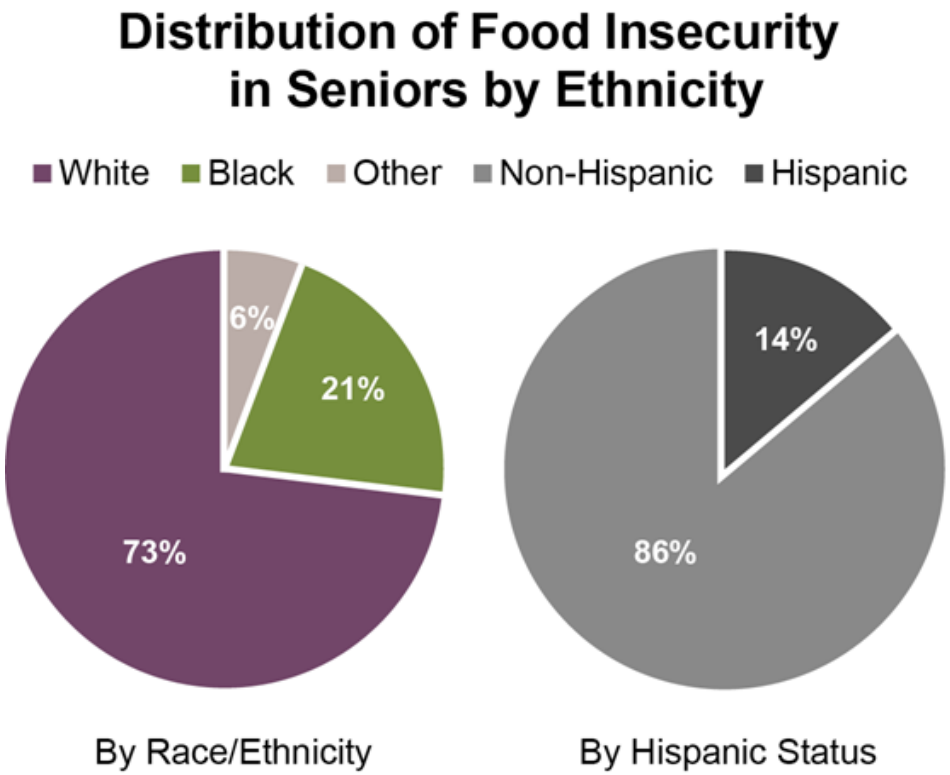


Figure 11. The racial/ethnic distribution of food insecurity in the senior population in 2015. Out of all seniors that reported facing marginal food insecurity in 2015, 73 percent were White, 21 percent were Black, and 6 percent were Native American, Asian, or Pacific Islander. Additionally, of those surveyed, 14 percent identified as Hispanic. Figure produced using calculations from the Nation Foundation to End Senior Hunger (2017).[2]

Grandparents Raising Grandchildren

Unexpected circumstances can lead seniors to struggle to secure adequate amounts of food. According to the latest estimate, almost 58,000 Missouri grandparents reported they were heads of households, responsible for the grandchildren that live with them.[30] Grandparents are called on to care for their grandchildren due to factors such as parental substance abuse, incarceration, HIV/AIDS, death, poverty, and military deployment.[31] These situations are often unexpected and further strain the already limited budgets of older adult households and thus, make it exceptionally difficult to provide adequate nutrition for all family members.

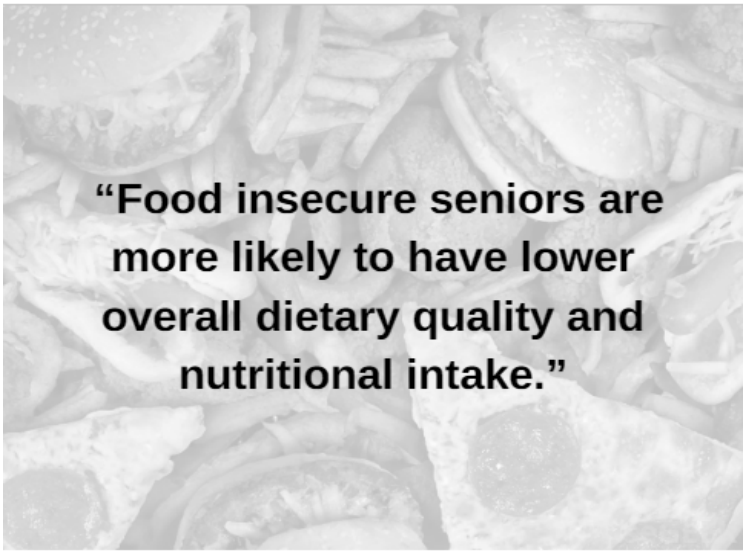
Residential Area Type

Americans face food insecurity in many regions around the country. Rural residents often face transportation issues in reaching grocery stores located many miles from where they live.[32] Conversely, others suffer because they live in urban food deserts, defined as impoverished areas that lack grocery stores, farmers' markets, and healthy food providers. Residents in these areas are limited to shopping at neighborhood convenience stores, where fresh produce and healthy options are limited, if available at all. When healthy food is available in food deserts, it is often sold at higher prices and is of lower quality, which further diminishes the appeal of these items to buyers.[33,34] On the other end of the continuum are food swamps, which are areas where unhealthy foods are more readily available than healthy foods. Recent evidence suggests that food swamps may, in fact, be more prevalent than food deserts and that they may underlie the association between food availability and poor diet quality more so than food deserts.[35,36] For most people in these situations, cheap, calorie-dense convenience foods are purchased more often than healthy hard-to-get fruits and vegetables.

Impact

What are the Effects of Food Insecurity?

Food insecurity has been linked to adverse outcomes in economic, social, physical, and psychological domains.[15] Though the American economy has been out of recession since June 2009, food insecurity rates have been slow to decline and continue to remain higher than pre-recession levels.[1] The economic costs of food insecurity among adults include income loss, work absenteeism, greater demand for public benefits and social services, and increased rates of health care and social welfare expenditures.[15]



Food insecure seniors are more likely to have lower overall dietary quality[33] and nutritional intake[34] than their food secure counterparts. More specifically, older adults with marginal food insecurity consume fewer calories, protein, and essential vitamins and minerals.[34] Decreased nutrient intake and malnutrition have a large impact on seniors and can result in an increase in brittle bones,[35,36] muscle mass loss,[37,38] and susceptibility to colds and flus.[39,40] Epidemiological studies indicate that food insecurity is a strong predictor of future health problems.[41] Food insecure older adults are at a higher risk for chronic conditions and experience higher rates of depression, asthma, heart attack, diabetes, gum disease, high blood pressure, and congestive heart failure.[34] Likewise, these seniors are more likely to have limited activities of daily living,[34] inhibiting their ability to perform normal daily activities independently, such as bathing, dressing, and eating.

A 2012 survey of food pantry users of the Food Bank for Central and Northeast Missouri service areas found the majority of respondents aged 65 or older reported having high blood pressure, fair or poor health status, or high cholesterol (see Figure 12).[15] Additionally, almost half reported having diabetes, were told they needed to lose weight by a health professional, or had limited activities of daily living due to physical, mental, or emotional problems. One third reported exercising less than one time per week. Although it is clear that food insecurity is associated with high risk of illness and therefore an assumed increase in overall health care costs, data documenting this association and its magnitude are still limited.[42]

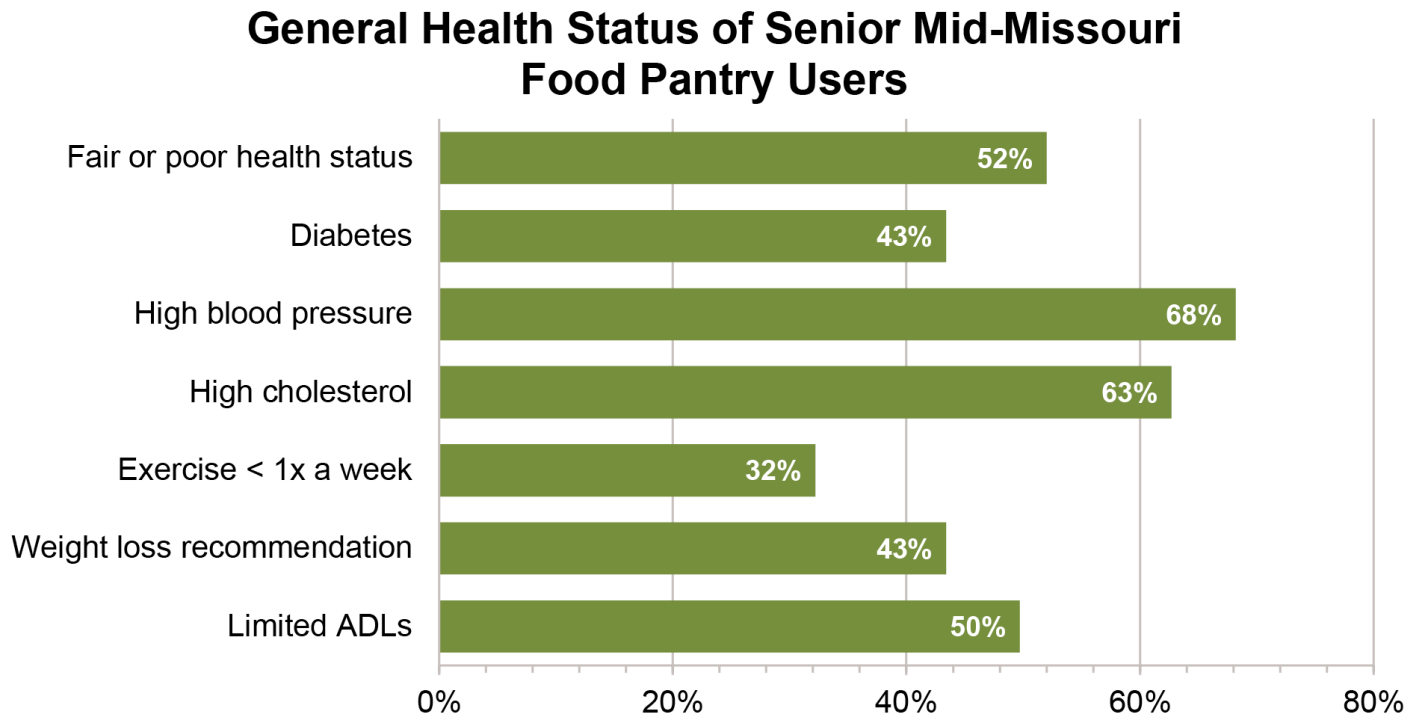
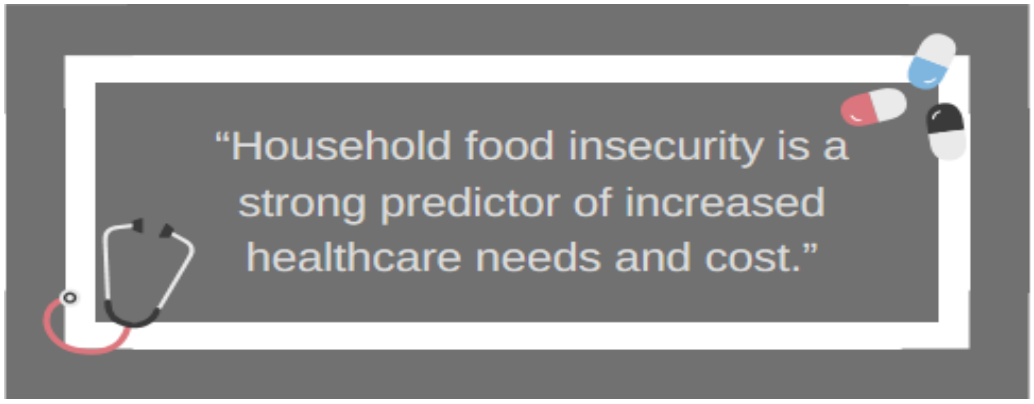


Figure 12. General health status of mid-Missouri food pantry users aged 65 and over. Food insecure seniors in mid-Missouri were more likely to have negative health outcomes than food secure seniors. Figure produced using values from the University of Missouri's Interdisciplinary Center for Food Security.[15]

How Does Food Insecurity Affect Health Care Needs and Costs?

Given the strong correlation between food insecurity and negative health outcomes, it is not surprising that household food insecurity is also a strong predictor of increased health care needs and cost.[43] Ziliak, Gundersen, and Haist[26] reported that food insecurity could seemingly age a senior by as much as 14 years, which could impede his or her quality of life and life span. Food insecure seniors often have more doctors' office visits and show increased use of specialized health care services, emergency room visits, and more frequent hospitalizations, than their food secure counterparts.[12] Inadequate nutrition can also have long-term detrimental effects; along with leading to serious disease, it can also impede healing after surgery, slow recovery from a broken bone, and increase susceptibility to infectious disease. Studies have estimated that at least 5 percent of elderly adults living in the community setting, 60 percent of hospitalized older adults, and between 35 to 85 percent in long-term care facilities, are malnourished.[44] Malnutrition is prevalent in the elderly, but it is often poorly recognized and misdiagnosed. To illustrate, the reported rate of emergency room (ER) visits due to nutritional deficiencies in Missouri residents aged 65 or older in 2014 was 0.02 per 1,000 individuals,[45] while the rate of Missouri in-patient hospitalization for nutritional deficiencies was 1.09 per 10,000 individuals.[46] These figures are lower than the rates of ER visits and hospitalizations due to other chronic diseases common to older adults, such as diabetes and heart disease. Health care professionals may not be adequately screening, assessing, or documenting malnutrition.[44] Furthermore, because inadequate nutrition is rarely reported as the primary reason for such visits, the full extent to which food insecurity plays a role in influencing the rate of these ER visits and hospital stays also remains unclear. Both health professionals and community-based organizations have expressed the need for more comprehensive training on the issue, as early detection is vital in reversing the effects of inadequate nutrition before more serious problems arise.

Given that hunger can indirectly impact many behaviors and health conditions facing older adults, it is especially important for health providers to consider the impact of food insecurity upon the health of their elderly patients. For example, if a medical provider is treating an elderly patient for diabetes and the patient is non-compliant in taking his or her medication, the provider can inquire about access to food and financial burdens as these issues could prevent him or her from complying with the care plan.[47] Insufficient funds for medication and food may lead a patient to take lower doses than the amount recommended by his or her doctor or even skip doses in order to conserve their medication. In fact, seniors who experience food insecurity are four times more likely to skip their medication dosages or stop taking them altogether.[48] On the other hand, taking medication on an empty stomach or with inadequate amounts of food may cause nausea or sickness and may influence the patient to take medication less often than recommended. Skipping a dose or halting medication intake can have vast consequences for older adults with serious or chronic health conditions and can lead to worsening health outcomes for the estimated 81 percent of older adults who use at least one medication and the 29 percent who use five or more.[49] Although seldom recognized, medication use can also alter nutrition status by hampering nutrient absorption.[50] Screening for food insecurity in addition to malnutrition may prevent or lessen more serious health complications.



While hunger often exacerbates an underlying health condition, the opposite can also be true. For some, inadequate oral hygiene can be a cause for malnutrition as it can interfere with chewing and make it difficult or painful to eat.[51,52] One recent study found that older patients with dental problems were three times more likely to suffer from malnutrition than those without dental problems.[53] In fact, of all the measured variables, researchers found poor oral health to have the largest impact on malnutrition, even more so than food insecurity and lack of transportation. Dental impairments in older adults are associated with reduced intake of vitamins, calcium, dietary fiber, and protein.[54,55] Furthermore, oral health problems affect not only the ability to eat and speak but are also associated with serious health conditions like diabetes, heart disease, stroke, and osteoporosis.[59]

Food insecurity can also have unintended psychological effects,[57] which can increase health care needs and costs. Food insecurity promotes stress and anxiety, worsens depressive symptoms,[58] impairs cognitive function,[59] and drains energy from cognitive resources needed for self-care and the self-management of complex illnesses.[60] Various co-morbidities like mental illness or dementia can affect seniors appetite and prevent them from cooking for themselves.[61]

Older adults with health complications also face an increased risk of unemployment and disability, which indirectly implies increased individual caregiving and national health care costs.[62] In spite of the federal government spending more than $100 billion per year on nutrition assistance programs in the last decade, there has been no reduction in the number of people affected by food insecurity in the U.S. during that time.[63] Moreover,

it has been estimated that at least $160 billion was spent on increased medical costs, lost educational achievement, and lack of worker output as a result of food insecurity in the U.S. in 2014.[64] All of these findings emphasize the high health-related costs of food insecurity and hunger. Such costs are likely to increase if current trends continue and new policies are not implemented.

What's the Link Between Food Insecurity and Obesity?

The prevalence of cheap, non-nutritious food has given rise to the coexistence of food insecurity and obesity.[65,66] Some studies suggest that aging adults suffering from symptoms of anxiety and depression brought on by food insecurity may cope by overeating and indulging in unhealthy food when they have access to food, which may fuel the positive correlation between food insecurity and obesity.[67] This phenomenon stems from the fact that less healthy foods are often cheaper than fresh fruits and vegetables, lean proteins, and whole grains, and low-income households are often forced to rely on the more economical food choices when feeding their families on a limited budget.[68] Conversely, a study in Georgia examined congregate meal participants and found that inappropriate eating behaviors, such as uncontrolled or emotional eating, were more strongly associated with obesity than depression or anxiety in their older adult population.[69] Moreover, less healthy food typically requires less planning and preparation.

Undernourishment associated with obesity in older adults is a growing issue. Individuals in this condition typically are malnourished in micronutrients, necessary vitamins and minerals for growth, as a result of chronic overeating, under consumption of nutrient rich foods, and decline in physical activity.[70] Thirty-nine percent of the Missouri adults aged 65 or older surveyed in 2015 reported consuming less than one serving of fruit per day and 24 percent reported consuming less than one serving of vegetables per day.[71] Although not all of these Missourians face food insecurity, these findings suggest that the majority of Missouri seniors do not meet the recommended USDA dietary guideline of two cups of fruit and 2.5 cups of vegetables per day,[72] which may underline why 38 percent of Missouri seniors reported being overweight (body mass index (BMI) of 25–29.9) and 30 percent reported being obese (BMI of 30 or higher) in 2016.[71] Such dietary choices jeopardize senior health because obesity puts older adults at an increased risk for comorbidities and chronic health problems such as diabetes and heart disease.

Strategies and Trade-offs

How Do Seniors Cope with Food Insecurity?

Low-income older adults often have unique difficulties meeting basic food and health care needs due to age or disease related declines of physical function and health status as well as a decrease in the extent and availability of social support systems.[17] Rather than alleviate health conditions, as mentioned earlier, the strategies older adults use to cope with food insecurity can exacerbate existing health conditions and further compromise their health, nutrient intake, and ability to remain in their own homes. Many low-income, older adults with multiple chronic conditions and limited financial resources may be forced to face an ongoing cycle of spending decisions and trade-offs. The most common coping strategies and trade-offs are shown in Figure 13.

According to a Meals on Wheels report, the most common strategies to stretch constrained budgets include buying the cheapest food even if it is unhealthy, seeking help from family or friends, watering down food or drinks, selling or pawning personal property, and trying to grow food at home or in a community garden (see Figure 13).[10] In addition to providing food for seniors, community gardens have other positive effects on seniors health. Studies have confirmed that gardening is beneficial to the physical, mental, and social well-being of seniors, promoting physical activity, socialization, relaxation and better eating habits.[73]

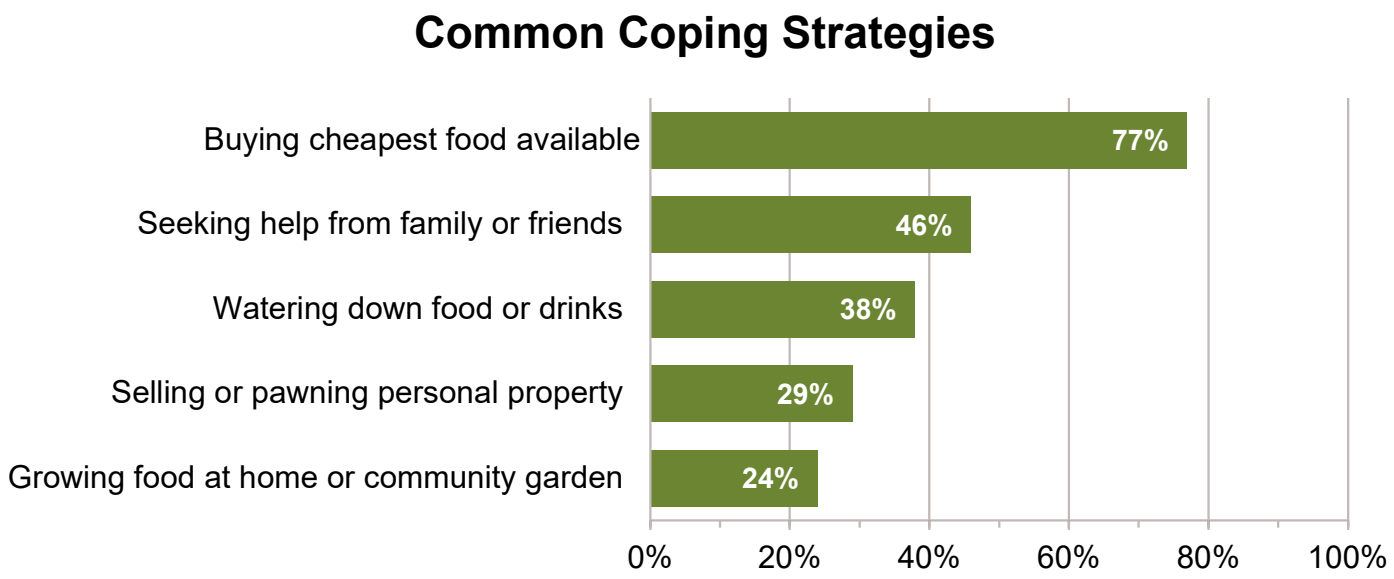


Figure 13. Common coping strategies among food insecure seniors. Many seniors employ a variety of coping strategies to deal with food insecurity, including buying the cheapest food available even if it is unhealthy. Figure produced using values from Meals on Wheels.[10]

What Trade-offs Do Food Insecure Seniors Make?

According to a national survey, the most common trade-offs for food include paying for medical care, utilities, transportation, or housing.[13] For households with a family member over the age of 75, the most common trade-off is skipping medication to buy food or vice versa.[13]

A survey by the Central and Northeastern food pantry found Missouri seniors are not exempt from the trade-offs reflected in national data. The 2012 survey of 1,212 Central and Northeastern Missouri food pantry users found that 63 percent of seniors could not afford to pay for all of their essential expenses.[15] Notably, many seniors reported they could not pay the full amount of their utility bills, rent or mortgage, or gas or transportation, similar to the findings of the national Hunger in America client survey. Additionally, many older adults also reported not being able to afford to see a dentist or a doctor when they needed to (see Figure 14).

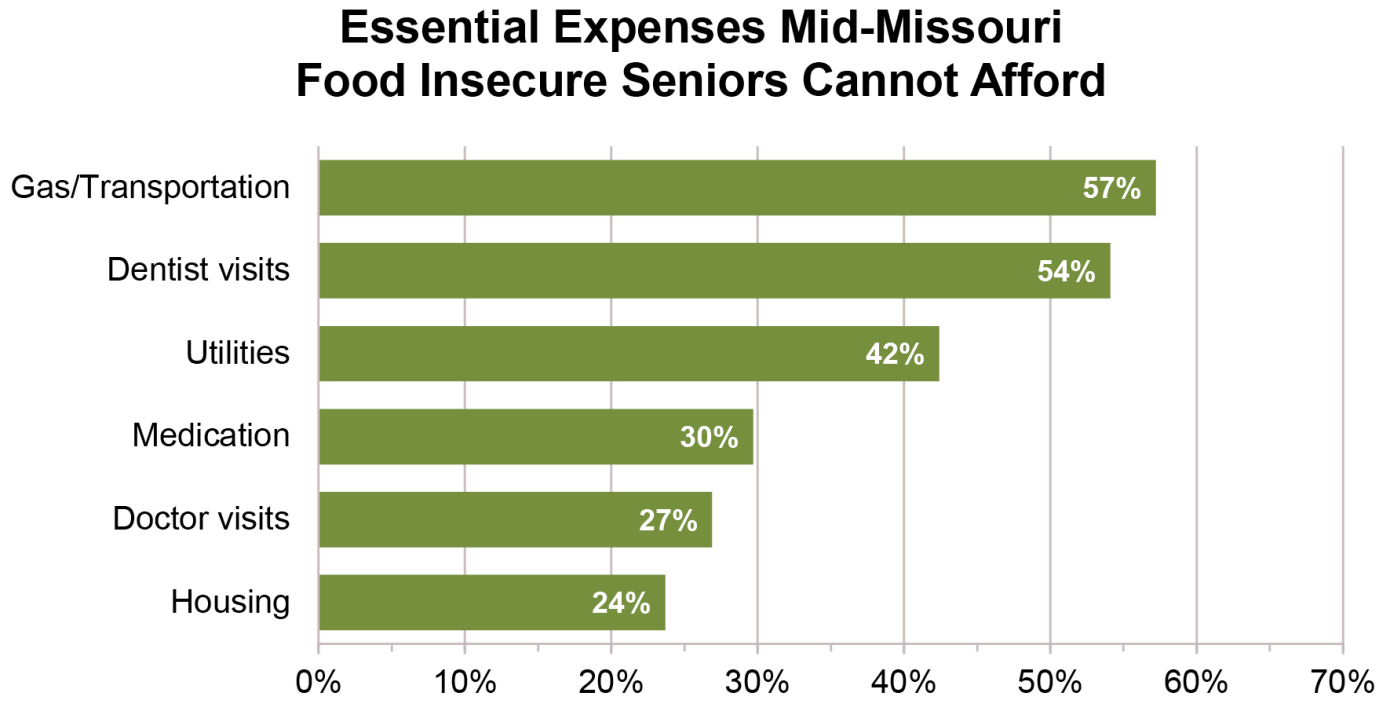


Figure 14. Essential expenses mid-Missouri food insecure seniors cannot afford. The majority of senior Central and Northeastern Missouri food pantry users were unable to pay for all of their essential expenses, including paying for gas and transportation, visits to the dentist, and utility bills. Figure produced using values from MU, Coping with Hunger.[15]

The most common trade-off in a sample of Central and Northeastern Missouri food pantry users was having to choose between buying food and paying for gas/transportation (see Figure 15).[15] Individuals 65 and over that were surveyed were more likely than their younger counterparts to have to choose between buying food and paying for medicine or medical care. Again, these findings reflect national trends, suggesting that an increasing number of Missourians have inconsistent access to food, and an even greater number are unable to meet their food needs through existing acquisition and coping strategies.[15]

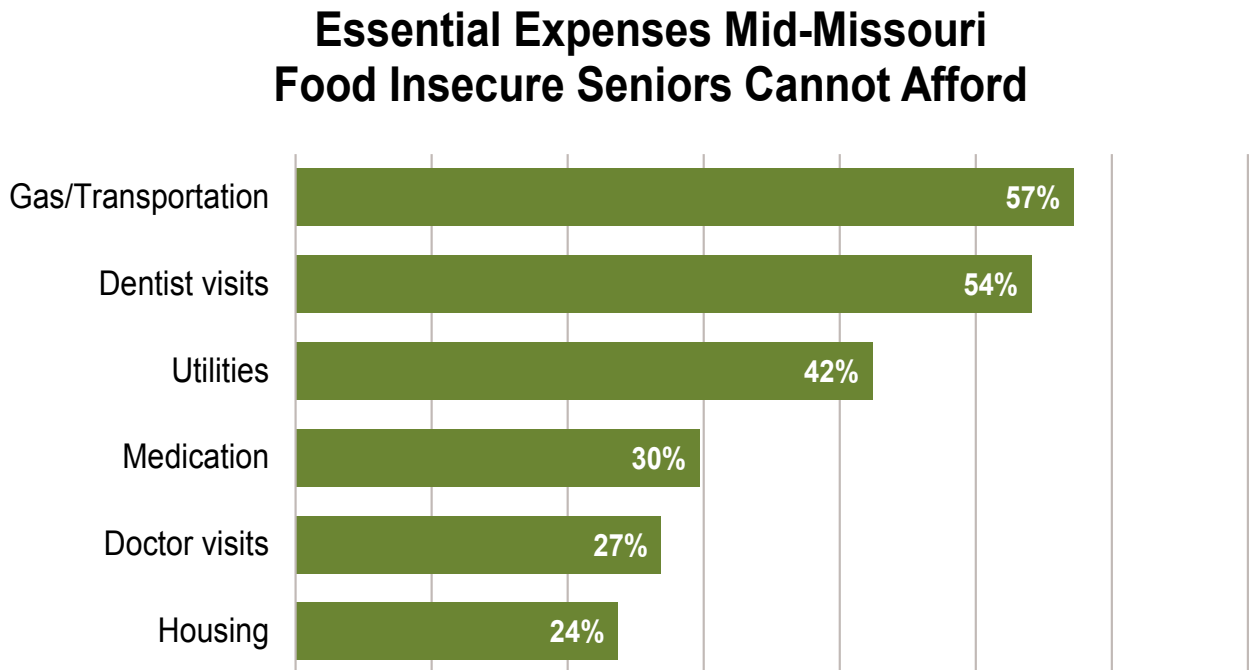


Figure 15. Common food trade-offs reported by Mid-Missouri food pantry seniors. Food insecure seniors in mid-Missouri face continual spending trade-offs between paying for food and paying for other essentials like gas/transportation, utility bills, medicine and medical care, and rent/mortgage. The most common trade-off was paying for gas and transportation. Figure produced using values from MU, Coping with Hunger.[15]

Food Assistance

The following provides an overview of the nutritional assistance programs available to Missouri seniors. Although most federal assistance programs are restricted to low-income households, many private nutritional services are available to anyone in need regardless of income level. More information about the eligibility requirements for each program can be found by visiting the program's website.

Supplemental Nutrition Assistance Program (SNAP)

SNAP, often referred to as Food Stamps, is the largest federal program in the domestic hunger safety net. Nationally, the program provides monthly food assistance benefits to 45.8 million low-income Americans,[14] including about 4.4 million Americans over the age of 60, each month.[14] In Missouri, 65,000 elderly households, amounting to 71,000 elderly individuals, participated in SNAP in 2015.[14]

SNAP benefits are based on means-testing (income, and in some states, asset tests) to determine eligibility. The household level of benefits is determined by income level and family size. The resource test requires that a household's liquid assets must be valued below $2,250. The countable resources for elderly individuals aged 60 or older must be valued below $3,500. However, certain resources are not counted in this asset test, such as home and lot, most retirement/pension plans and educational savings, and portions of the value of household vehicles. The income test consists of a maximum gross monthly income and a net monthly income allowance. Households without an elderly or disabled member must have gross income below 130 percent of the federal poverty guidelines and a net income below 100 percent of the poverty line after specified deductions. Households with an older adult aged 60 or older, however, only have to meet the net income test. Information on the net income test and income limits to qualify for SNAP in Missouri can be found at the following link: https://dss.mo.gov/fsd/pdf/food-stamp-changes-flyer.pdf.

SNAP benefits are loaded onto an Electronic Benefits Transfer (EBT) card and can be used to purchase approved foods at participating grocery stores, farmers' markets, and meal delivery services, such as Meals on Wheels. Participating grocery stores in the St. Louis and Kansas City areas double the purchasing power of SNAP benefits when used to buy fresh fruits or vegetables. These "double benefits" are also available at participating farmer's markets across the state. Seniors and their caregivers can search for farmers' markets or grocery stores that accept SNAP and EBT cards at: http://www.doubleupheartland.org/how-it-works/grocery-stores/.

Studies have found that the receipt of SNAP benefits is associated with improved food security. A national survey reported that SNAP participation decreased food insecurity in SNAP households by 6 to 17 percent and severely food insecure households by 12 to 19 percent.[74] For older adults, the receipt of SNAP benefits is also associated with a reduction in avoidable health care costs. Two recent studies in Maryland found that SNAP participants who were dually eligible for both Medicare and Medicaid had fewer hospitalizations and nursing home admissions than dually eligible seniors who did not receive SNAP benefits.[75,76] More specifically, one study found that SNAP participants had a reduced likelihood of hospitalizations but not ER use and that enrolling the SNAP-eligible non-participants in SNAP would have resulted in an estimated hospital cost savings of $19 million for the state of Maryland.[75] The second study reported that SNAP participants were 23 percent less likely to be admitted into a nursing home compared with SNAP non-participants and that each additional $10 of monthly SNAP assistance was associated with lower odds of admissions and fewer days stay among those admitted to the nursing facility.[76] This study estimated that extending SNAP to all of the sample's non-participants would have been associated with an estimated savings of $34 million in Medicaid nursing home costs to the state. Together these findings suggest that increasing food access to low-income older adults may be one of the most cost-efficient ways to improve quality of life by allowing older adults to remain in their homes longer, improve health outcomes, and reduce avoidable hospital and health care spending.

Although many studies have found that SNAP participation results in improved food security and reduced medical care costs, levels of older adult participation by eligible persons in the program remain low.[74-76] According to the 2017 America's Health Rankings' Senior Report, Missouri's SNAP reach ranked 37th among states.[6] Fifty-four percent of Missourians aged 60 years or older living in poverty participated in SNAP, which is much lower than the national average of 70 percent.[6] The reasons seniors may not apply for SNAP benefits include embarrassment, culture, difficulty with or limited understanding of the application process, inaccurate perceptions of the application process, low perceived benefit for applying, and stigma (see Figure 16).[10] The fear of welfare stigma associated with receiving SNAP may range from personal distaste for receiving Food Stamps to the fear of disapproval from others when redeeming Food Stamps.[77,78] The minimum benefit of $17 may also be deemed too small for some families. Fortunately, the large majority of older adults over 65 receive substantially higher than the minimum; in fact, the average monthly SNAP benefit for households with seniors in 2015 was $128 nationally[14] and $115 in Missouri.[78]

Figure 16. Reasons for not applying for SNAP. Examples of reasons why seniors may not apply for SNAP benefits. Figure adapted from Meals on Wheels America (2017).[10]

Commodity Supplemental Food Program (CSFP)

CSFP, funded by the USDA, works to improve the health of low-income adults at least 60 years of age by supplementing their diets with nutritious USDA approved foods. CSFP food packages do not provide a complete diet, but are good sources of the nutrients typically lacking in the diets of the target population. Participants receive a monthly food package valued at approximately $40. The Missouri Department of Health and Senior Services is responsible for the administration, monitoring, and program oversight of CSFP. Missouri's six Feeding America food banks order, receive, warehouse, and package the commodities. The food banks partner with local organizations to determine the eligibility of applicants, distribute the food packages, and provide nutrition education. The current number of participants served monthly in Missouri is 24,814. The current income eligibility guidelines can be found at the following link: http://health.mo.gov/living/wellness/nutrition/foodprograms/csfp/eligibility.php. To find CSFP provider locations throughout the state, visit: https://ogi.oa.mo.gov/DHSS/commFoodSite/index.html.

The Emergency Food Assistance Program (TEFAP)

The USDA donates food to states under The Emergency Food Assistance Program (TEFAP) to supplement the diets of low-income people, including older adults, at no cost. In Missouri, the six regional Feeding America food banks receive these donated foods and distribute them to local food pantries for eligible persons and households. Households in which all members receive some form of public assistance (such as SNAP) are eligible to receive USDA donated food, regardless of income. Otherwise, the gross monthly income limit is 125 percent of the Federal Poverty Guidelines or 150 percent for households that include one or more older adults or persons with disabilities. For more information about the program, visit: https://www.fns.usda.gov/tefap/emergency-food-assistance-program-tefap.

Older Americans Act Home-Delivered and Congregate Meals

Older Americans Act home-delivered meals can provide a stable source of nutrition, increase nutrient intake, and help older adults remain independent. The Older Americans Act (OAA) programs target populations with the greatest social and economic need, paying particular attention to low-income, minority, rural, those with limited English proficiency, and those at risk for institutionalization. Though the program aims to help historically under-served populations, low-income is not a criterion for service as means testing is not allowed for OAA programs. In Missouri, ten local Area Agencies on Aging (AAA) are responsible for administering OAA Title III C funding for nutrition services throughout their geographic boundaries. Services include frozen or shelf-stable home-delivered meals for homebound seniors and congregate meals for seniors who are not homebound. Each meal is designed to provide a third of the daily recommended nutritional requirements for a senior. The program aims to reduce hunger and food insecurity, promote socialization, health and well-being, and delay the onset of adverse health conditions resulting from poor nutritional health.[10] Consistent with the positive results from the research literature on home-delivered meals and meal enhancements, OAA nutrition program participants experience benefits including more food security, self-reported ability to remain at home, and social interaction.[79] Visit the following webpage for additional information about OAA services and the Missouri AAAs: http://health.mo.gov/seniors/aaa/index.php.

Medicaid Home-Delivered Meals

In addition to OAA Title III meals, Medicaid-funded home-delivered meals can be authorized by a Missouri Department of Health and Senior Services Home and Community Based Services assessor to assist in meeting the nutritional needs of the participant. Home-delivered meals can be authorized to individuals who

are unable to prepare a balanced meal or who otherwise need the home-delivered meal to meet their individual care needs. Home-delivered meals provide participants with one or two meals per day, each of which contains at least a third of the recommended daily nutritional requirements. To qualify, all participants must be in active Medicaid status, at least 63 years of age, have an appropriate Medicaid Eligibility code, meet nursing facility level of care, and have authorization through the Aged and Disabled Waiver. For additional information regarding the Medicaid Home-Delivered Meals program, visit: http://health.mo.gov/seniors/hcbs/hcbsmanual/pdf/3.40.pdf.

Child and Adult Care Food Program (CACFP)

CACFP is funded by the USDA but is administered by Missouri Department of Health and Senior Services. This program serves children under 18 who are enrolled in child care facilities and/or after school programs. This program also serves adults ages 60 and above and adults age 18 and above who are functionally impaired. All participants must be enrolled in the program in order to participate. The program provides reimbursements to child and adult daycare centers and schools for well-balanced, nutritious, and creditable meals served. Nationwide, the program benefits about 130,000 adults daily. Adult day cares in Missouri served 775,558 meals in 2017. For more information, visit: http://health.mo.gov/living/wellness/nutrition/foodprograms/cacfp/adult_care.php.

Additional Resources

Community partners play an important role for seniors needing food assistance resources in the local community. They provide a wide array of services in addition to access assistance, including eligibility screening and application assistance for federal nutrition programs, referrals to dietitians and nutritionists, and nutrition education. These services are especially important for older adults who are unfamiliar with the availability and eligibility requirements for programs, who did not qualify when they were younger and do not realize that due to their age or income status may qualify now, or who are uncomfortable using technology required to submit application materials.

The Missouri Department of Social Services provides a free online pre-screening tool to help individuals determine whether they are eligible for a variety of services, including, but not limited to, SNAP and MO HealthNet for the Aged, Blind and Disabled. To find out what services you may qualify for, visit: https://apps.dss.mo.gov/fmwBenefitCenter/PreEligibilityTool.aspx.

Missouri's ten Area Agencies on Aging are responsible for providing Older America Act services in their respective geographical region and are available to assist older individuals by providing benefits counseling and information about resources and services in their local areas. To find your local Area Agency on Aging visit: http://www.ma4web.org/contact.

In addition to public assistance programs, an estimated 46.5 million Americans, including 7 million seniors, receive food from one of approximately 58,000 food pantries operating nationwide.[80] Evidence suggests that roughly 76 percent of households with a senior plan to visit a food pantry on a regular basis.[81] However, given that food pantries rely on donations to stock their shelves, patrons have no control over the health and quality of the food available to them, and many users report deficient food options.[82] To find a food pantry in your area, visit: https://www.foodpantries.org/st/missouri. For more information about Missouri's six Feeding America food banks, visit: http://feedingmissouri.org.

Individuals seeking immediate assistance can call 2-1-1 to get connected with emergency help with food, housing, or other essential needs. In addition many communities have local non-profit or faith-based organizations that help with emergency access to food.

Opportunities

Identifying opportunities to reduce food insecurity and subsequently its consequences will have a direct benefit on the health of older Missourians. The following road-map briefly identifies ways to alleviate senior food insecurity in our state. The section after the road-map provides descriptions of the most prevailing methods for policy makers and community members to consider. The suggestions provided here are just a few examples of ways to raise senior hunger awareness and to support seniors in their fight against hunger.

Roadmap of Opportunities

1. Improvements to Federal and State Assistance Programs
    a. Explore options to enhance the availability of SNAP:
        - Evaluate the impact of increased SNAP benefits to eligible seniors on reducing health cost expenditures
        - Evaluate other state programs' SNAP application and eligibility requirements for seniors to explore opportunities to increase SNAP benefits for seniors

    b. Increase SNAP Awareness and Participation Among Seniors:
        - Explore the benefits of the Elderly Simplified Application Project (ESAP) to make the SNAP application and renewal process easier for seniors
        - Coordinate enrollment between multiple public assistance programs to lessen burden on both seniors and program administrators
        - Identify eligible older adults who are not enrolled in SNAP and conduct targeted outreach to improve senior assistance program participation
        - Increase minimum benefit amount for seniors so they are guaranteed a higher benefit each month
        - Educate policy makers on the effectiveness of the SNAP program and other benefits programs in reducing health care costs

    c. Expand Access to the Commodity Supplemental Food Program:
        - Provide services to new populations and communities as caseloads allow

2. Nutritional Enhancements
    a. Improve Food and Nutrition Screening:
        - Urge health professionals to identify nutritionally at-risk patients by asking patients questions about food security and dietary quality
        - Recommend that health professionals use standardized nutrition screening tools
        - Train health professionals to become more familiar in available local services and to direct seniors to appropriate specialists for further assistance

    b. Provide Meals After Hospital Discharge:
        - Educate hospitals and key stakeholders about available partnerships with Area Agencies on Aging and Meals on Wheels to provide nutritionally at-risk patients with home-delivered meals after discharge

    c. Improve Fresh Produce Intake:
        - Encourage caregivers to serve nutritious meals that follow the recommendations of the current Dietary Guidelines for Americans
        - Educate policy makers on the effectiveness of food pharmacies which help needy, low-income households obtain affordable healthy food
        - Support the development of mobile food pantries and markets to improve access to affordable food in food desert areas

- Encourage policy makers to grant additional funding the USDA's Senior Farmers' Market Nutrition Program (SFMNP) in Missouri
- Expand the number of farmers' markets participating in SNAP through education and awareness outreach
- Form collaborations with community gardens and community-supported agriculture to improve the quantity and quality of produce intake among the elderly
- Provide nutrition education and food preparation training to promote healthy eating behaviors

d. Minimize Plate Waste:
   - Encourage seniors to limit food waste by pre-planning meals and learning to properly store food

3. Community Development
   - Improve public transportation to and from fresh produce retailers to improve access to affordable healthy food
   - Encourage food retail development by improving existing infrastructure
   - Consider incentivizing existing food retailers in food deserts to carry more healthy products
   - Encourage neighborhood associations and policy makers to apply for Community Development Block Grants to improve their communities and attract more food retailers
   - Work with food retailers to adjust their hours of operation to be open at peak demand for consumers who have restricted temporal access to food

4. Improvements to Related Services
   a. Improve Geriatric Dental Care:
      - Spread awareness of proper oral hygiene and educate seniors on programs and supplemental insurance plans that provide dental coverage
      - Promote teledenistry to allow dentists to practice in partnership with hygienists to serve more seniors

   b. Promote Aging-at-Home Initiatives:
      - Advocate for increased funding for Older Americans Act services
      - Promote awareness of the Money Follows the Person Rebalancing Demonstration program

   c. Educate Seniors Raising Grandchildren:
      - Spread awareness of the federal assistance programs available to "grandfamilies" and caregivers through the Older Americans Act, Area Agencies on Aging and other community providers

   d. Improve Economic Opportunity for seniors:
      - Educate seniors on the availability of pharmacy assistance programs
      - Prepare seniors for the workforce by providing skills training and helping them to secure stable employment
      - Promote the availability of benefits screening and enrollment available through the Area Agencies on Aging and other community agencies
      - Offer seniors money management and retirement savings education

5. Create Awareness
   a. Provide Senior Food Insecurity Education:
      - Encourage community leaders and policy makers to educate themselves on the causes and effects of food insecurity and work on changes to prevent it

   b. Spread Awareness of the Problem:
      - Take small steps in raising awareness by volunteering to deliver meals, teach a cooking class, or organize a food drive for a local food pantry

Selected Areas of Opportunity

1. Improvements to Federal and State Assistance Programs

a. Explore Options to Enhance the Availability of SNAP

In addition to increasing general awareness for SNAP and other nutrition programs' impact on reducing health cost expenditures, one opportunity to further fight senior hunger in Missouri is to increase the number of seniors that are eligible for SNAP. To do so, the state can consider allowing broad-based categorical eligibility for SNAP to allow most, if not all, low-income households to be eligible for benefits. Additionally, the state can consider joining 15 other states and territories that have already increased the threshold for gross income to 200 percent of the federal poverty line limits for households with elderly adults.[83] In addition to helping countless older adults supplement their monthly income, such a policy initiative would also assist the working middle poor and the under-employed classes that are struggling to put food on the table for their families.[83]

b. Increase SNAP Awareness and Participation Among Seniors

In an effort to increase SNAP awareness and participation among seniors, the state can consider several opportunities. First, policy makers can select policy options and request federal waivers to reduce SNAP enrollment barriers for seniors. More specifically, they can consider reducing enrollment requirements for seniors by implementing the Elderly Simplified Application Project (ESAP). This program streamlines income and expense verification by matching data from existing sources, extends certification periods to 36 months, waives the recertification interview, and makes use of a simplified two-page application.[84] This waiver is granted for five years and makes it easier for elderly households to get and stay enrolled in SNAP while it reduces the administrative burden on states. Although the ESAP program is not available in Missouri, it is already implemented in seven other states.[85]

To lessen the burden on both seniors and program administrators, the state can also begin coordinating enrollment between multiple public assistance programs that have similar enrollment criteria. The Combined Application Project,[86] for example, allows households in which all members receive Supplemental Security Income (SSI) benefits to file a shortened SNAP application without having to complete a face-to-face interview at the SNAP office. This exemption is especially helpful for the elderly who may find it difficult to reach local social services offices. It also allows households to have longer certification periods than SNAP's normal certification periods, which increases administrative efficiency and reduces client burden within human service agencies. As of 2013, 18 states were operating Combined Application Projects.[87] Similarly, the state can streamline enrollment by coordinating application and verification requirements across other programs like Medicaid, so that enrollment into one program carries over to other programs.[88]

Additionally, more can be done to identify and reach out to eligible older adults not already enrolled in SNAP to make them aware of all the programs they may potentially qualify for. To target the right people, the state can leverage administrative data from programs like Medicaid and the Low Income Home Energy Assistance Program to identify income eligible older adults that are not enrolled in SNAP. In addition to ensuring that all eligible individuals are enrolled in SNAP, Missouri Area Agencies on Aging can provide application assistance to older adults, so these individuals receive all the benefits they are eligible for.

To ensure that seniors are not discouraged by the lengthy application process some states have enacted a guaranteed minimum benefit for seniors so that after applying, eligible seniors can count on receiving a worthwhile benefit each month. Maryland, for instance, recently passed Senate Bill 758 [89] to ensure that all SNAP beneficiaries aged 62 and older received a minimum benefit of $30 monthly. To supplement the regular federal benefit for these individuals, additional state funds are allocated as needed,[28] at the cost of approximately $2.9 million per year.

Lastly, to ensure that no seniors lose current benefits, substantial efforts need to be made to prevent significant federal cuts to the SNAP program. Currently, SNAP program rules and regulations are issued by the federal government and benefits are entirely federally funded, while administrative costs are split equally between the state and the federal government. However, proposals have recently been made to cut more than $150 billion (over 20 percent) of federal spending on SNAP over the next ten years and shift the costs over to the states.[90] Changes of this magnitude would result in drastic benefit reductions and eligibility restrictions that would devastate low-income households, especially the elderly and adults with disabilities.[91] Many studies show that the receipt of SNAP benefits reduces the prevalence of food insecurity[25]; thus, the potential reductions in medical expenditures that would otherwise be incurred as a result of continued food insecurity should be carefully considered when evaluating the benefit and cost burden of programs like SNAP.

c. Expand Access to the Commodity Supplemental Food Program

It is important to continue to expand access to CSFP to new communities and populations as caseloads allow, ensuring as many eligible seniors as possible benefit from the program. A total of 17,162 participants were served monthly in Missouri in 2016. In 2017, the USDA granted Missouri's request for an increased caseload.[92] The caseload was increased by 7,652 participants served monthly by the USDA in 2017. This brings the total for the current caseload to 24,814 participants served monthly. The increased caseload allowed Missouri to expand the areas and populations served. To continue the expansion of the program, the Missouri Department of Health and Senior Services will continue to assess the need to submit requests for increased caseloads annually to the USDA. This will ensure the maximum number of food packages available are delivered to seniors who need them most.

2. Nutritional Enhancements

a. Improve Food and Nutrition Screening

Although it is estimated that up to 65 percent of acutely hospitalized older adults are at nutritional risk or suffer from malnutrition[93], physicians and health professionals often do not recognize the symptoms. Food insecurity often impedes a senior's ability to adhere to specially prescribed diets and treatment plans. Educating the health community regarding the prevalence of food insecurity and malnutrition among older adults, and the availability of resources to address this, can support the augmentation of treatment plans to achieve better health outcomes for their patients. Nutrition assessments and interventions to address malnutrition produce outcomes of 28 percent less avoidable readmissions, 25 percent less pressure ulcers, shorter lengths of stay in the hospital, and a lower mortality rate.[94] Recent advocacy efforts in other states include Resolution 17-05,[95] which was passed by the New York State Academy of Family Physicians to support food insecurity screening in children using validated tools like the two-question Hunger Vital Sign™.[96] Such resolutions are not law but do encourage physicians to act. Similar resolutions to encourage health providers to screen the elderly more thoroughly can be promoted to spread awareness of senior food insecurity as well.

In addition to increasing awareness, enhancements to food and nutrition screening need to be made.[97] To improve the detection of malnutrition and food insecurity in seniors, physicians and health professionals should be urged to openly ask questions about food insecurity and dietary quality. This includes performing screenings at doctor's offices, hospitals, and even senior centers. Hospitals should be encouraged to complete a screening within 24 hours of admission, regularly throughout the stay, and in some cases continue after discharge.[98] The Malnutrition Quality Improvement Initiative (MQII) has been designed to help organizations improve malnutrition care and subsequently achieve better outcomes. The primary goal is to advance evidence-based, high-quality, patient-driven care for hospitalized older adults who are malnourished or at-risk for malnutrition.[99] Trained professionals can use the screenings to assess nutritional risk and to determine if a complete nutritional assessment is needed.

A large number of screenings have been created for these purposes.[100] For example, the Mini Nutritional Assessment (MNA) is a common tool that identifies older adults at risk for malnutrition and only takes 10 to 15 minutes.[101,102] The shortened version, MNA-SF, takes less than four minutes. Another example is the two-part assessment developed by the Nutrition Screening Initiative.[103] The first part consists of a body mass index calculation and a simple checklist, known as DETERMINE,[104,105] which includes 10 questions about food and drink intake, health status, personal autonomy, and socioeconomic status that can be filled out by the older individual, a close relative, or by a caregiver. The screening is self-scored and classifies the individual as well-nourished or at mild or severe risk of malnutrition. The second part of the assessment is carried out by a health professional and includes more advanced assessment techniques like anthropometric measurements and biochemical markers. Further information about the DETERMINE Checklist can be found on the National Resource Center on Nutrition and Aging's website www.nutritionandaging.org/toolkit-the-nutrition-screening-initiatives.[106] Other similar screenings include the Malnutrition Universal Screening Tool (MUST),[107] the Malnutrition Screening Tool (MST),[108] the Short Nutrition Assessment Questionnaire (SNAQ),[109] and the Nutrition Risk Screening 2002 (NRS-2002),[110] all of which share a similar accuracy in detecting risk of malnutrition.[111] More information about these and other screening tools can be found at: https://www.ncoa.org/center-for-healthy-aging/resourcehub/assesssments-tools/malnutrition-screening-assessment-tools/.

Once food insecurity or nutritional risk is established, the elderly individual can be given more information about interventions, such as nutrition assistance programs, and directed to appropriate specialists for further counseling and assistance. Senior centers and other community partners with the proper resources can provide services to help individuals secure the necessary support by assisting them to fill out applications and gather appropriate documents.

b. Provide Meals After Hospital Discharge

Malnutrition in hospitalized patients is strongly associated with longer stays[112-114] and higher rates of readmission, [112,113,115,116] especially in seniors.[117] Not surprisingly, these issues are costly for both the patient and the health care facility.[118] One way to decrease such costs is to improve nutrition during hospital stays and after discharges. Hospitals can form partnerships with local Area Agencies on Aging and Meals on Wheels organizations so that when a patient is identified as nutritionally at-risk at the hospital, they may be referred to one of those organizations for possible home-delivered meals after discharge. Together these organizations can provide approximately ten meals to eligible at-risk patients after discharge. Given the robust impact nutrition has on health care costs, Medicare and other relevant stakeholders that would benefit from the cost savings should be encouraged to fund such programs. Not only can proper nutrition help keep seniors out of hospitals, but meal provision could also improve the chances of earlier release and decrease the likelihood of readmission after discharge.

c. Improve Fresh Produce Intake

Poor diet is a risk factor for the onset of diseases like diabetes, obesity, heart disease, and stroke.[119,120] To ensure proper nutrition among the elderly, the amounts and types of foods consumed should be evaluated to assess which nutrients may be lacking from the diet. Then foods that provide those missing nutrients can be supplemented at meal time. As an example, the Older Americans Act Nutrition Programs require that each meal provides at least one third of the recommended Dietary Reference Intakes established by the National Academy of Sciences and must adhere to the current Dietary Guidelines for Americans, issued by the Secretaries of the Departments of Health and Human Services and Agriculture.[121]

Many additional considerations exist for seniors living in the community who can shop for and cook their own food. One creative way to address both under-nutrition and poor eating habits is with food pharmacies. The

Geisinger Fresh Food Farmacy[122] in central Pennsylvania, for example, provides financial and social incentives to motivate people to change their eating habits. The food pharmacy provides weekly healthy food, nutrition classes, and cooking advice to patients and their families, free of charge. Although Geisinger Health System was one of the first to create a stand-alone food pharmacy, there are over 70 similar programs across the country.[123] Food pharmacies allow physicians, registered dietitians, and other health professions to write a prescription for healthy foods that can be used by low-income patients to receive healthy foods for free or at a reduced cost. In some programs, the patients may also get coupons they can redeem for produce at a reduced cost using SNAP benefits at participating farmers' markets and stores. Given the staggering costs of health care, investing in healthy food initiatives such as this one can save thousands of dollars per patient per year.[124]

A different way to help seniors increase their fresh fruit and vegetable consumption is through the use of mobile food pantries and markets.[125] Mobile food vending helps distribute food items to under-served locations and to people who lack transportation. This method of food vending is efficient and cost-effective because it does not require a permanent building and has little overhead. The St. Louis Metro Market,[126] for example, is a non-profit mobile farmers' market that provides access to fresh, healthy, and affordable produce to St. Louis City food deserts. The donated city bus referred to as Turnip 1 travels to both food deserts and corporate parking lots to distribute locally sourced fruits and vegetables, and uses the revenue from consumers at corporate campuses who pay full retail prices to offset the cost of providing quality food at cost to low-income communities. For more information, visit their website: https://www.stlmetromarket.com/.

Another way to help low-income seniors gain access to local fresh produce is to increase funding to the USDA's Senior Farmers' Market Nutrition Program (SFMNP) in Missouri. Over 52 state agencies and federally recognized Indian Tribal Organizations have been awarded the SFMNP grant, which provides low-income seniors with nutrition education and coupons that can be exchanged for eligible foods at farmers' markets, roadside stands, and community-supported agriculture programs.[127] Vouchers are typically issued for $20-50 for each farmers' market calendar year, and states can supplement the benefit level with additional funds. The Missouri bill (HB 1625)[128] to allow the state to apply for a grant to establish the SFMNP program did pass in 2018. Additional efforts to promote awareness of this program can be encouraged throughout the state to urge Missouri policy makers to provide additional state funds to the program.

Another way to improve access to farmers' market produce for seniors is to expand the number of farmers' markets participating in SNAP. According to the Center for Disease Control, only 15 percent of Missouri farmers' markets accepted SNAP benefits in 2012.[129] Expanding participation in the SNAP program will allow SNAP beneficiaries to purchase fresh local produce at a more affordable price. SNAP can be extended to other places as well, such as New York City's Green Carts program. Green Carts are mobile food carts that offer fresh produce in areas with limited healthy food access.[130] Recently, these cart vendors began to accept SNAP EBT transactions and researchers have found that since the implementation, consumers who used SNAP purchased more healthy food compared with those who paid with cash.[131,132] To further expand the reach and impact of SNAP, an innovative USDA-sponsored pilot program is allowing recipients of SNAP benefits to purchase groceries online.[133] This two-year program will allow households to make online food purchases at select retailers starting in early 2019. Although SNAP dollars cannot cover delivery fees, retailers may choose to waive the cost for SNAP consumers. Whether retailers decide to forgo the delivery fee or not, this pilot and other food home-delivery programs can help households that live in food deserts access food without the hassle of finding the time or securing the transportation needed to get to a grocery store. However, this service may be underutilized by low-income older adults who may lack the skills needed to use online food delivery platforms.

Another way to increase healthy food consumption is to form partnerships with community gardens and community-supported agriculture. Some states have successfully advocated changing land use policies to transform unused parking lots into community gardens, and similar efforts can be taken in Missouri. Additionally,

senior centers could consider starting a community garden with the help of non-profit organizations. The University of Missouri Extension[134] and MU's Interdisciplinary Center for Food Security,[135] for example, both offer programs and resources on how to start and maintain a garden. In addition to providing an activity for the patrons of the senior center, the center can use half of the harvested vegetables in its kitchen and can consider allowing participants to take the other half of the harvest home. Alternatively, community-supported agriculture is a method to support local farmers directly while providing fresh produce to local community members. In these programs, a farmer offers a membership or subscription that can be purchased in advance, and in return, the consumer receives a box of seasonal produce each week throughout the growing season. This type of arrangement benefits both the farmers and the consumers because the farmers get paid early in the season and receive a better price for their crops without having to market their products, while consumers can rely on receiving continual fresh produce and the satisfaction of directly supporting local farmers. Although such programs have a higher cost, state agencies and local Area Agencies on Aging may explore the possibility of sponsoring a limited number of subscriptions to community-supported agriculture programs for local seniors able to cook for themselves.

Healthy food intake is difficult without the knowledge of how to prepare healthy meals. It is especially important to provide nutritional guidance to consumers with low levels of education in food desert areas. Nutrition education can come in many forms, including cooking demonstrations, recipe sharing, and workshops. Another way to educate the public is to offer shopping assistance at the store and to train shoppers on proper food storage techniques. As an example, the University of Missouri Extension offers useful Family Nutrition Education Programs to low-income adults and children.[136] Other initiatives such as SNAP Education[137] or Share Our Strength's Shopping Matters and Cooking Matters programs[138,139] can also educate consumers about the importance of eating a healthy diet as well as offer guidance on how to incorporate a healthier diet on a limited budget.

d. Minimize Plate Waste

Given the high prevalence of food insecurity in the U.S., it may be surprising to learn that food waste is a significant problem in this country. Forty percent of all food produced in the U.S. ends up in a landfill[140] and food makes up approximately 20 percent of landfills.[141] In fact, food is the single largest component of municipal landfills and accounts for 35 million tons of municipal solid waste in the U.S.[142] Much of this wasted food is perfectly edible and nutritious.[142] An active effort to reduce food waste may be yet another indirect way to ensure more food is available to seniors who need it most.

The first way to reduce food waste starts at home. Food often spoils due to improper storage, lack of visibility in refrigerators, failure to use up partially used ingredients, and misjudged food needs. Poor meal planning can lead to overbuying at the store and preparing too much food can result in excess leftovers that eventually get discarded. Additionally, misinterpretation of date labels causes an estimated 90 percent of Americans to prematurely discard food.[143] To minimize waste, households can start by measuring the estimated amount of food they discard. Various calculators and mobile apps can help evaluate these losses, such as the Food Waste Diary app.[144] Larger organizations, such as food businesses and cafeterias, can use other tools like Environmental Protection Agency's Food Waste Management Cost Calculator[145] to estimate the cost competitiveness of alternative food waste disposal. Individuals and organizations can take the challenge to reduce food waste. To do so, consumers can create shopping lists in advance to shop more carefully for the ingredients they plan to prepare, learn how to properly store food to extend shelf life, become more mindful of old ingredients and leftovers that need to be consumed, and explore ways of preserving food. Those that have the outdoor space can also learn about composting as a way to repurpose excess food. Composting materials can be used to enrich the soil for growing fresh produce. To reduce plate waste, consumers can educate themselves on how to gauge proper portion sizes in order to prepare and service the correct amount at mealtime. Other ways to reduce waste include buying imperfect produce at the store to save them from getting discarded and planning meals around the perishables that are about

to expire with the help of apps like Spinning Meals[146] and Handpick.[147]

To explicitly tackle the issue of senior plate waste, NFESH's What a Waste™ campaign[148] evaluates congregate meals provided at senior centers and home-delivered meals. The program helps to identify and measure generated food and plate waste and develops customized solutions to reduce it. More specifically, the initiative intends to diminish senior food insecurity by improving meals through serving more appealing foods and increasing the number of nutrients that are consumed. To do so, the program analyzes the types and amounts of foods seniors do not consume at each meal. By examining meal site food waste, the program can calculate the nutrients seniors are missing and subsequently, explore more appealing food alternatives to replace the items that often get discarded. For more information about this program, visit:
https://www.nfesh.org/what-a-waste/.

3. Community Development

According to the USDA, reliable transportation, especially vehicle access, is one of the most critical determinants of whether a family can access affordable and nutritious food.[149] Access to a car allows families to leave a food desert or food swamp to shop at supermarkets and large grocery stores outside their neighborhoods. Studies suggest that price-sensitive families may bypass the closest store to go to outlets farther away that offer consistently lower prices.[150-152] Unfortunately, those with very low incomes and no vehicle access may not be able to get to stores that offer lower priced items.[149] Access to food is especially problematic for seniors, who are more likely to have mobility restrictions and lack reliable transportation. One way to increase access for seniors is to provide more efficient and affordable public transportation to allow consumers to get to supermarkets, farmers' markets, and congregate meals in surrounding areas. In addition to improving public bus and rail systems, states can consider subsidizing fares and even ride-share services such as Uber[153] and Lyft[154] to help vulnerable seniors get to the grocery store. It is also imperative to ensure that it is safe to walk and bike to get around the community for residents in these locations,[155] as many may not have access to a vehicle or be able to afford public transportation. Alternatively, for those who are home-bound, food and grocery delivery service would provide the most benefit.

One underlying explanation for the pervasiveness of food deserts is that often it is not economical for large stores to open in food deserts due to high building and operating costs.[149] These higher costs can be due to restrictive zoning regulations, increased security concerns, and farther distance from convenient delivery routes.[149] Additionally, small markets with relatively low purchasing power may not be perceived as profitable for food retailers. The most effective way to remove barriers to food retail development are to invest in infrastructure and community development in areas of concentrated poverty, which are more likely to be food deserts according to the USDA.[156] To create healthier living environments in these areas, Dutko[157] suggests providing loans, grants, or tax incentives which can help attract new supermarkets or supercenters to food desert areas.

More densely populated areas have added concerns to consider. Constructing supercenters and other large stores may not be feasible in urban areas because of the amount of land they require. In these cases, smaller stores can be created to fit in populated, under-served regions. Similarly, supermarket chains like Aldi's have developed smaller stores that are specifically designed to serve low-income and bargain shoppers in a smaller square footage. In addition to building new stores, new policies need to be developed to encourage already existing stores in food deserts to carry a more extensive variety of healthier products. Local efforts, like New York City's Healthy Bodegas Initiative[158] for example, can provide expertise, grants, or loans to help smaller stores carry fresher options.[157]

Though the federal government has spent almost $500 million to improve food store access in neighborhoods that lack large grocery stores since 2011,[159] more state and local initiatives are needed to attract food retailers to food deserts and to encourage the sale of healthier products. To illustrate, cities can consider partnering with neighborhood associations to use Community Development Block Grants to open new food shopping centers in

high need areas. The Community Development Block Grant Entitlement Program is one of the Department of Housing and Urban Development's longest-running programs and serves low- and moderate-income populations by providing resources to tackle a wide range of community development needs.[160] Cities can apply for and use these funds to benefit under-served food desert areas. However, because different infrastructure issues exist in each community, it is important to recognize regional differences and to develop solutions that are community-specific.[161]

A final point to consider is the constraints of food retail operating hours. Some food insecure individuals may have limited temporal access, rather than spatial access, to healthy food. In other words, the daily operating hours of food outlets that offer healthy options may be limited or may not correspond to an individual's schedule or time availability.[162] Time constraints can have a substantial impact on purchase decisions because households with less time are more likely to purchase prepared foods and more convenient items.[163] For example, an individual who works long or non-conventional hours may have limited time to visit a store during the store's regular business hours. Time may be even more constrained for someone who travels a long distance to get to a food retailer, especially if he or she must use public transportation to get there, which often takes longer than driving a personal vehicle. Accordingly, one way to improve food access for those with time constraints is to adjust store hours so these households can obtain food when it is most convenient for them.

4. Improvements to Related Services

a. Improve Geriatric Dental Care

Dental insurance is not widespread among the older adult population. Medicare does not cover most dental care, dental procedures, or supplies. In some instances when a hospital provides care, Medicare Part A may pay for limited dental services or emergency dental procedures. Otherwise, older adults may obtain routine dental care only through a Medicare Advantage (Part C) managed care plan, a Medicare supplemental insurance or Medigap plan, or a separate stand-alone dental insurance plan. Therefore, advocates should educate seniors on the importance of proper oral care for general health and consider developing a resource to increase knowledge of supplemental insurance plans that provide dental coverage for seniors.

When dental specialists are not available locally, teledentistry may be another option. In 2016, Missouri passed legislation to revise the telehealth statute (SB 579)[164] originally enacted in 2009 to include dental services. Teledentistry allows on-site dental hygienists to perform services under the supervision of an off-site dentist. The remote dentist can review electronic medical records and communicate with the hygienists through telecommunication platforms. The remote dentist can then make decisions about what dental treatment is needed and the local staff can offer dental services, including prevention and early intervention procedures.[165] Teledentistry reduces the time and cost of traveling outside of one's community to visit a dentist and allows dentists to practice remotely in partnership with hygienists to service more seniors, especially those living in rural areas.

b. Promote Aging-at-Home Initiatives

States with larger investment in home-delivered meal programs and higher Older Americans Act (OAA) funding tend to have a lower proportion of low-care nursing home residents.[166] Thus, expansion of these programs can help keep low-care residents out of institutions. The OAA was passed in 1965 to provide services to assist seniors to remain independent in their homes and communities, and provides federal funding to states for services such as in-home assistance, home-delivered meals, and preventive health services. Generally, services are available to individuals aged 60 or older regardless of income, but priority is given to low-income, minority, rural, those with limited English proficiency, and those at risk for institutionalization. For more information about OAA services in Missouri, visit: http://health.mo.gov/seniors/aaa/. Medicaid also offers similar services and provides long-term care funding for low-income individuals who qualify. For more information about nursing home alternatives,

please visit: https://www.medicare.gov/nursinghomecompare/Resources/Nursing-Home-Alternatives.html.

c. Educate Seniors Raising Grandchildren

To help the growing number of Missouri grandparents raising grandchildren, more efforts need to be made to educate these families about assistance programs available to them. Federal and state public benefits programs can help eligible households with income, food, health care, home energy, and other needs.[167]

One program, Temporary Assistance for Needy Families (TANF), provides limited cash assistance to very low-income families with children, helping pay for clothing, utilities, and other services. In Missouri, these grants do not have work requirements or the typical 60-month time limit if the legal caregiver is over the age of 60 years. For more information about Missouri's program, visit: https://mydss.mo.gov/temporary-assistance.

Another useful program is the National Family Caregiver Support Program (NFCSP). It can help provide information, assistance in gaining access to services, individual counseling, support group organization, caregiver training, respite care, and supplemental services, such as legal assistance, to grandparents and caregivers and other relatives aged 55 or older who are raising children aged 18 years or younger or children with disabilities of any age.[32] In addition to helping older adults raise children, the program is also available for adult family members who provide in-home and community care for persons aged 60 or older. Services for family caregivers are provided through the ten Missouri Area Agencies on Aging. To find your local Area Agency on Aging, visit: http://health.mo.gov/seniors/pdf/AAARegion.pdf.

Additional programs for the older adult caregiver include the National School Breakfast and Lunch Program (NSBLP), Women, Infants, and Children (WIC), Supplemental Security Income (SSI), and Social Security. NSBLP provides nutritionally balanced, low-cost or free meals to children in public and non-profit private schools and residential child care institutions each school day. For more information, visit: https://dese.mo.gov/financial-admin-services/food-nutrition-services. WIC provides supplemental foods, health care referrals, and nutrition education to low-income infants and children up to the age of 5 who are at-risk nutritionally. For more information, visit: http://health.mo.gov/living/families/wic/. SSI provides cash assistance to adults over the age of 65 with little or no income and few resources. For more details, visit: https://www.ssa.gov/ssi/. An additional Social Security benefit may be available to grandparents raising grandchildren. By filing for Social Security, a dependent grandchild or step-grandchild may receive benefits based on the work history of a grandparent. To qualify, the natural or adoptive parents of the child must be deceased or disabled at least one month before the onset of receiving retirement benefits or the grandchild must be legally adopted by the worker or the worker's surviving spouse. Qualified grandchildren are generally eligible to receive benefits that equal 50 percent of the grandparent's full retirement age benefit, up to a family maximum benefit. For more information, visit: https://www.ssa.gov/people/kids/.

d. Improve Economic Opportunities for Seniors

Initiatives that directly or indirectly assist seniors with more financial resources should be given attention and priority to help seniors struggling financially. Pharmacy assistance programs can help ensure seniors have enough money for food and other essential expenses. Medication use rises with increasing age because of greater chronic disease frequency and individuals with chronic health conditions spend more on medication than others.[168] Pharmacy assistance programs have a meaningful positive impact on seniors' access to prescription drugs and help seniors keep out-of-pocket prescription drug costs down. Missouri's pharmacy assistance program, MORx, assists by coordinating benefits with Medicare's (Part D) Prescription Drug Program. Individuals receiving Medicare and a MO HealthNet benefit are eligible for coverage and are automatically enrolled in the program.[169] For more information, visit: http://www.morx.mo.gov/.

Another way for seniors to increase their income is to gain and maintain stable employment. People today live longer, more expensive lives, but frequently have not saved adequately for retirement. As a result, the proportion of working older Americans has steadily risen over the past decade. In fact, nearly one in five seniors, or roughly 9 million older adults, over the age of 65 had a job in 2016.[170] Although some seniors voluntarily choose to work, millions of others reenter the workforce out of necessity. The most extensive economic safety net for older adults besides retirement savings is Social Security. Social Security provides millions of Americans, including retirees, disabled persons, and families of retired, disabled, or deceased workers, with monthly benefits.[171] Although Social Security benefits lift more than 26 million people out of poverty,[172] they only replace about 40 percent of an average worker's income and are not meant to be the sole source of income for people when they retire. Additionally, Social Security benefits have already lost about a third of their purchasing power since 2000[173] and their value is expected to decline further. Thus, a great deal more needs to be done to ensure seniors have a stable financial future when entering retirement.

One program that helps seniors gain employment is Missouri's Senior Community Service Employment Program (SCSEP). SCSEP is a job-training program for low-income individuals 55 years or older who wish to enter the workforce but need additional training or job placement assistance.[174] The primary goal is to help participants become job ready by providing job skill training, but the program also provides needed assistance to community host agencies by filling positions they could not afford to pay for on their own. Participants are subsidized by the SCSEP program and offered an average of 20 hours per week of paid training. For more information, call (573) 526-4542 or visit: http://health.mo.gov/seniors/senioremployment/.

Another way to help people save more money is to provide better money management and retirement savings education. Unfortunately for most seniors, such training usually comes too late. To make a difference, financial knowledge should be instilled in workers as soon as they enter the workforce and then continually reiterated as they progress through their careers. Some research analysts recommend that financial literacy start at an even younger age – as early as high school.[175] The Department of Labor's Retirement Savings Education Campaign, also known as Saving Matters,[176] is one helpful resource for workers and employers regarding this vastly important topic. The National Council on Aging's Savvy Saving Seniors® program[177] is another educational resource that teaches seniors to budget, avoid scams, manage prepaid debit cards, and learn other money management skills to help them become more financially responsible. It is clear that financial responsibility and money management are essential skills all individuals must possess no matter what age.

5. Create Awareness

a. Provide Senior Food Insecurity Education

Lastly, but of tremendous importance, is the need for increased education and awareness for communities regarding the prevalence and negative effects upon their seniors who experience food insecurity. With increased education, community members will be able to recognize the signs of food insecurity in their communities and develop action plans in order to help those in need.

b. Spread Awareness of the Problem

The best way to spread awareness of senior food insecurity is to share information and resources with those you know and become involved in presenting solutions. Community members can take small steps in raising awareness by volunteering to deliver meals, teaching a cooking class, or organizing a food drive for a local food pantry. AARP suggests numerous simple actions that can help combat senior hunger on its website https://www.aarp.org/aarp-foundation/our-work/hunger/info-2016/end-hunger-29-days-of-action.html.

It is also important to let your policy makers know that you and your community care about senior hunger. Encourage decision makers to work with local hospitals and health care organizations to promote nutrition programs aimed at improving senior health. Although such steps may seem minor at first glance, they are necessary and can lead to the successful passage of invaluable resolutions and nutrition-related legislation.

Conclusion

Food insecurity affects every part of our society, including education, health care, and our state and national economies.[23] We can all contribute to improving the quality and availability of healthy foods in our communities. Millions of seniors face food insecurity every day and the numbers struggling to maintain their food security has continued to rise in the U.S. in spite of the economic recovery following the Great Recession. Moreover, the rate of senior food insecurity is projected to increase as the older adult population grows in coming years. Food insecurity is associated with a host of avoidable health consequences and increased health care costs. Existing programs meant to alleviate food insecurity among seniors not only lack sufficient resources to address current demand, but also cannot determine where the greatest unmet needs lie. This is compounded by the knowledge that many eligible seniors do not participate in the existing programs because of the stigma associated with being on welfare, even though they are entitled to such benefits. The growing aging population will likely overwhelm the health care system if the threat of senior hunger is not addressed and if immediate interventions are not put in place to prevent it.

With improved outreach and education of program availability and eligibility requirements, more seniors can be enrolled in beneficial nutrition programs. Studies have shown that SNAP participation leads to an improvement in food security[74] and decreased medical utilization, such that each additional $10 of monthly SNAP assistance is associated with lower odds of hospital and nursing home admissions and fewer days stay among those admitted.[75,76]

Although the issue of senior hunger has received scant attention historically, much can be done to lessen its prevalence as discussed in this report. Improvements to food assistance program participation among seniors may take the form of increased access to programs and increased eligibility thresholds for seniors. Likewise, thorough nutritional screening, complementary home-delivered meals after hospital discharge, and nutrition education can all improve the quality of seniors' diets. To improve food access, regulations and incentives at the community level can be put in place to spur the development of healthy food grocers. General senior services such as improved dental care, pharmacy assistance programs, aging-at-home initiatives, job skills training, and savings education can help seniors save money so that they have enough resources for food. Last but not least, simple local efforts such as volunteering and advocacy can help spread awareness of this critical issue.

The recommendations proposed in this document are synergistic and often work together to have a strong impact to help older adults achieve food security. The recommendations help improve the health and well-being of low-income populations, reduce health care spending, and increase worker productivity. It is important to keep in mind that the needs of each community vary and initiatives that work in one region may not lead to the same favorable result in another area. Each new effort should, therefore, be specifically tailored to the needs of the local population. For example, policies that encourage access to affordable and nutritious food in under-served areas, such as zoning modifications and grants for new store development, will not have a significant influence on health if residents do not want to change their food-purchasing behavior or do not have the time or knowledge to prepare healthier foods. Simultaneously, efforts to provide nutrition education will be ineffective if it is too difficult or expensive for people to get to stores that carry healthier options. All of these considerations must be taken into account when designing initiatives and implementing new programs. Nevertheless, a wide array of opportunities to combat senior hunger exist in each community and this report should be used as an introduction to the issue and as a guide to encourage more in-depth and productive conversations.

References

1 Coleman-Jensen, A., Rabbitt, M. P., Gregory, C. A., & Singh, A. (2017). Household food security in the United States in 2016, ERR-237. USDA Economic Research Service. https://www.ers.usda.gov/webdocs/publications/84973/err-237.pdf

2 Ziliak, J. P., & Gundersen, C. (2017). State of senior hunger in America in 2015: An annual report. National Foundation to End Senior Hunger. http://nfesh.org/wp-content/uploads/state-of-senior-hunger-2015-annual-report.pdf

3 Administration for Community Living. (2017). Aging Integrated Database (AGID) [Data set]. Retrieved from https://agid.acl.gov/DataGlance/Pop_State/

4 Administration on Aging, Administration for Community Living, U.S. Department of Health and Human Services. (2017). A profile of older Americans: 2016. https://www.acl.gov/sites/default/files/Aging%20and%20Disability%20in%20America/2016-Profile.pdf

5 United Health Foundation. (2016). America's health rankings: Senior report 2016. https://assets.americashealthrankings.org/app/uploads/final-report-seniors-2016-edition-1.pdf

6 United Health Foundation. (2017). America's health rankings: Senior report 2017. http://assets.americashealthrankings.org/app/uploads/ahr2017_seniorreport.pdf

7 U.S. Department of Agriculture. (2017). Food security in the U.S.: Measurement. Economic Research Service. https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/measurement/

8 Ziliak, J. P., & Gundersen, C. (2009) Senior hunger in the United States: Differences across states and rural and urban areas. Meals on Wheels Association of America, Inc. Retrieved from http://nfesh.org/wp-content/uploads/senior-hunger-2008-full-report.pdf

9 Fox, L., Wimer, C., Garfinkel, I., Kaushal, N., & Waldfogel, J. (2015). Waging war on poverty: Poverty trends using a historical supplemental poverty measure. Journal of Policy Analysis and Management, 34(3), 567-592. http://doi.org/10.1002/pam.21833

10 Meals on Wheels America. (2017). Hunger in older adults: Challenges and opportunities for the aging services network. http://www.mealsonwheelsamerica.org/docs/default-source/research/hungerinolderadults-fullreport-feb2017.pdf

11 Berkowitz, S. A., Seligman, H. K., & Choudhry, N. K. (2014). Treat or eat: Food insecurity, cost-related medication underuse, and unmet needs. The American Journal of Medicine, 127(4), 303-310.e3. https://doi.org/10.1016/j.amjmed.2014.01.002

12 Bhargava, V., & Lee, J. S. (2016). Food insecurity and health care utilization among older adults in the United States. Journal of Nutrition in Gerontology and Geriatrics, 35(3), 177-192. http://dx.doi.org/10.1080/21551197.2016.1200334

13 Feeding America & AARP Foundation. (2015). Baby boomers and beyond: Facing hunger after fifty. Retrieved from http://www.feedingamerica.org/research/senior-hunger-research/facing-hunger-after-fifty.html

14 Farson Gray, K., Fisher, S., & Lauffer, S. (2016). Characteristics of Supplemental Nutrition Assistance Program households: Fiscal year 2015. USDA Food and Nutrition Service. https://www.fns.usda.gov/snap/characteristics-supplemental-nutrition-assistance-households-fiscal-year-2015

15 Cafer, A., Foulkes, M., Heflin, C., Hermsen, J., Raudeke, N., & Rikoon, S. (2013). Coping with hunger in 2013: Food pantry clients and households in the service region of the Food Bank for Central and Northeast Missouri. Columbia, MO: University of Missouri, Interdisciplinary Center for Food Security. http://foodsecurity.missouri.edu/wp-content/uploads/2014/01/Coping-with-Hunger_Dec-2013.pdf

16 National Research Council. (2006). Food insecurity and hunger in the United States: An assessment of the measure. J. L. Norwood & G. S. Wunderlich (Eds.) Washington, DC: The National Academies Press. https://doi.org/10.17226/11578

17 Lee, J., & Frongillo, E. J. (2001). Nutritional and health consequences are associated with food insecurity among U.S. elderly persons. Journal of Nutrition, 131(5), 1503–1509. http://jn.nutrition.org/content/131/5/1503

18 Ziliak, J. P., & Gundersen, C. (2016). State of senior hunger in America in 2014: An annual report. National Foundation to End Senior Hunger. http://nfesh.org/wp-content/uploads/state-of-senior-hunger-2014-full-report.pdf

19 Ziliak, J. P., & Gundersen, C. (2015). State of senior hunger in America in 2013: An annual report. National Foundation to End Senior Hunger. http://nfesh.org/wp-content/uploads/state-of-senior-hunger-2013-full-report.pdf

20 Ziliak, J. P., & Gundersen, C. (2012). State of senior hunger in America in 2010: An annual report. Meals on Wheels Research Foundation. http://nfesh.org/wp-content/uploads/state-of-senior-hunger-2010-full-report.pdf

21 Ziliak, J. P., & Gundersen, C. (2013). State of senior hunger in America in 2011: An annual report. National Foundation to End Senior Hunger. http://nfesh.org/wp-content/uploads/state-of-senior-hunger-2011-full-report.pdf

22 Ziliak, J. P., & Gundersen, C. (2014). State of senior hunger in America in 2012: An annual report. National Foundation to End Senior Hunger. http://nfesh.org/wp-content/uploads/state-of-senior-hunger-2012-full-report.pdf

23 Missouri Foundation for Health. (2015). Health equity series: Food insecurity. https://mffh.org/wordpress/wp-content/uploads/2016/04/Health-Equity-Series-Food-Insecurity.pdf

24 Semega, J. L., Fontenot, K. R., & Kollar, M. A. (2017). Income and poverty in the United States: 2016. U.S. Census Bureau. https://www.census.gov/content/dam/Census/library/publications/2017/demo/P60-259.pdf

25 Gundersen, C., Kreider, B., & Pepper, J. (2011). The economics of food insecurity in the United States. Applied 5Economic Perspectives and Policy, 33(3), 281-303. https://doi.org/10.1093/aepp/ppr022

26 Ziliak, J. P., Gundersen, C., & Haist, M. (2008). The causes, consequences, and future of senior hunger in America. Lexington, KY: UK Center for Poverty Research, University of Kentucky. http://www.rockfordhealthcouncil.org/RHorg2013/wp-content/uploads/2011/04/Senior-Hunger-in-America-Document.pdf
27 Gundersen, C., & Gruber, J. (2001). The dynamic determinants of food insufficiency. In M. S. Andrews & M. A. Prell (Eds.), Second food security measurement and research conference, volume II: Papers, (pp. 92-110). Food Assistance and Nutrition Research Report 11-2. USDA Economic Research Service. http://ageconsearch.umn.edu/record/33883/files/fa011102.pdf
28 Ribar, D., & Hamrick, K. (2003). Dynamics of poverty and food sufficiency, Food Assistance and Nutrition Research Report 33. U.SDA Economic Research Service. https://www.ers.usda.gov/webdocs/publications/46753/15939_fanrr36_1_.pdf
29 Leete, L., & Bania, N. (2010). The effect of income shocks on food insufficiency. Review of the Economics of the Household, 8, 505–526. https://doi.org/10.1007/s11150-009-9075-4
30 Strickhouser, S., Wright, J. D., & Donley, A. M. (2014). Food insecurity among older adults. Washington, DC: AARP Foundation. http://www.aarp.org/content/dam/aarp/aarp_foundation/2015-PDFs/AF-Food-Insecurity-2015Update-Final-Report.pdf
31 U.S. Census Bureau. (2017). 2016 American Community Survey 1-Year Estimates [Data set]. Grandparents living with own grandchildren under 18 years by responsibility for own grandchildren by presence of parent of grandchildren and age of grandparent. Retrieved from https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_1YR_B10051&prodType=table
32 Generations United. (2007, May). Fact Sheet: Grandparents and other relatives raising grandchildren: Their inclusion in the National Family Caregiver Support Program. Retrieved from http://www.gu.org/LinkClick.aspx?fileticket=Lgq5WfhP-Tg%3d&tabid=157&mid=606
33 Montoya, M. F., Hite, A. W., Rohrbeck, P., Bawa, B., Akinwolemiwa, O. O., Benson, A. M., ... & Ortiz, C. A. R. (2011). Quality of diet related to food insecurity and food stamps use among older people. Ageing Research, 2(1), 3. http://doi.org/10.4081/ar.2011.e3
34 Gundersen, C., & Ziliak, J. P. (2017). The health consequences of senior hunger in the United States: Evidence from the 1999-2014 NHANES. National Foundation to End Senior Hunger. http://nfesh.org/wp-content/uploads/health-consequences-of-senior-hunger-in-the-united-states-1999-2014.pdf
35 Surdykowski, A. K., Kenny, A. M., Insogna, K. L., & Kerstetter, J. E. (2010). Optimizing bone health in older adults: the importance of dietary protein. Aging Health, 6(3), 345–357. http://doi.org/10.2217/ahe.10.16
36 Tucker, K. L., Hannan, M. T., Chen, H., Cupples, L. A., Wilson, P. W., & Kiel, D. P. (1999). Potassium, magnesium, and fruit and vegetable intakes are associated with greater bone mineral density in elderly men and women. The American Journal of Clinical Nutrition, 69(4), 727-736. Retrieved from http://ajcn.nutrition.org/content/69/4/727
37 Fujita, S., & Volpi, E. (2006). Amino acids and muscle loss with aging. The Journal of Nutrition, 136(1 Suppl), 277S–280S. Retrieved from http://jn.nutrition.org/content/136/1/277S
38 Yanai, H. (2015). Nutrition for sarcopenia. Journal of Clinical Medicine Research, 7(12), 926–931. http://doi.org/10.14740/jocmr2361w
39 Katona, P., & Katona-Apte, J. (2008). The interaction between nutrition and infection. Clinical Infectious Diseases, 46(10), 1582-1588. https://doi.org/10.1086/587658
40 Pae, M., Meydani, S. N., & Wu, D. (2012). The role of nutrition in enhancing immunity in aging. Aging and Disease, 3(1), 91. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3320807/
41 Stuff, J. E., Casey, P. H., Szeto, K. L., Gossett, J. M., Robbins, J. M., Simpson, P. M., ... & Bogle, M. L. (2004). Household food insecurity is associated with adult health status. The Journal of Nutrition, 134(9), 2330-2335. http://jn.nutrition.org/content/134/9/2330
42 Seligman, H. (2016). Food Insecurity, Health, and Health Care. Retrieved from: https://cvp.ucsf.edu/resources/Seligman_Issues_Brief_1.24.16.pdf
43 Tarasuk, V., Cheng, J., de Oliveira, C., Dachner, N., Gundersen, C., & Kurdyak, P. (2015). Association between household food insecurity and annual health care costs. CMAJ : Canadian Medical Association Journal, 187(14), E429–E436. http://doi.org/10.1503/cmaj.150234
44 Furman, E. F. (2006). Undernutrition in older adults across the continuum of care: Nutritional assessment, barriers, and interventions. Journal of Gerontological Nursing, 32(1), 22-27. http://doi.org/10.3928/0098-9134-20060101-11
45 Missouri Department of Health and Senior Services. (n. d.). Missouri Information for Community Assessment (MICA) [Data set]. Emergency Room MICA. Retrieved from http://health.mo.gov/data/mica/MICA/
46 Missouri Department of Health and Senior Services. (n. d.). Missouri Information for Community Assessment (MICA) [Data set]. Inpatient Hospitalizations MICA. Retrieved from http://health.mo.gov/data/mica/MICA/
47 Blumberg, S. J., Bialostosky, K., Hamilton, W. L., & Briefel, R. R. (1999). The effectiveness of a short form of the Household Food Security Scale. American Journal of Public Health, 89(8), 1231-1234. http://doi.org/10.2105/AJPH.89.8.1231
48 Berkowitz, S. A., Seligman, H. K., & Choudhry, N. K. (2014). Treat or eat: food insecurity, cost-related medication underuse, and unmet needs. The American Journal of Medicine, 127(4), 303-310. https://doi.org/10.1016/j.amjmed.2014.01.002
49 Qato, D. M., Alexander, G. C., Conti, R. M., Johnson, M., Schumm, P., & Lindau, S. T. (2008). Use of prescription and over-the-counter medications and dietary supplements among older adults in the United States. JAMA, 300(24), 2867-2878. http://doi.org/10.1001/jama.2008.892

50 Piccolo, K. M., & Boullata, J. I (2016). The influence of polypharmacy on nutrition. In A. Bendich & R. J. Deckelbaum (Eds.), Preventative Nutrition (5th ed.) (pp. 83-113). Switzerland: Springer International Publishing. https://doi.org/10.1007/978-3-319-22431-2
51 Walls, A. G. W., & Steele, J. G.(2004). The relationship between oral health and nutrition in older people. Mechanisms of Ageing and Development, 125(12), 853-857. https://doi.org/10.1016/j.mad.2004.07.011
52 Kazemi, S., Savabi, G., Khazaei, S., Savabi, O., Esmaillzadeh, A., Keshteli, A. H., & Adibi, P. (2011). Association between food intake and oral health in elderly: SEPAHAN systematic review no. 8. Dental Research Journal, 8(Suppl1), S15–S20. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3556278/
53 Burks, C. E., Jones, C. W., Braz, V. A., Swor, R. A., Richmond, Hwang, K. S., … & Platts-Mills, T. F. (2017). Risk factors for malnutrition among older adults in the emergency department: A multicenter study. Journal of the American Geriatrics Society, 65(8), 1741-1747. http://doi.org/10.1111/jgs.14862
54 Marcenes, W., Steele, J. G., Sheiham, A., & Walls, A. W. (2003). The relationship between dental status, food selection, nutrient intake, nutritional status, and body mass index in older people. Cadernos de Saúde Pública, 19(3), 809-816. http://dx.doi.org/10.1590/S0102-311X2003000300013
55 Mojon, P., Budtz-Jorgensen, E., Rapin, C. H. (1999). Relationship between oral health and nutrition in very old people. Age and Ageing, 28(5), 463-468. https://doi.org/10.1093/ageing/28.5.463
56 Petersen, P. E., & Yamamoto, T. (2005). Improving the oral health of older people: the approach of the WHO Global Oral Health Programme. Community Dentistry and Oral Epidemiology, 33(2), 81-92. http://dx.doi.org/10.1111/j.1600-0528.2004.00219.x
57 Heflin, C., Siefert, K., & Williams, D. (2005). Food insufficiency and women's mental health: Findings from a 3-year panel of welfare recipients. Social Science & Medicine, 61, 1971-1982. https://doi.org/10.1016/j.socscimed.2005.04.014
58 Johnson, C. M., Sharkey, J. R., & Dean, W. R. (2011). Indicators of material hardship and depressive symptoms among homebound older adults living in North Carolina. Journal of Nutrition in Gerontology and Geriatrics, 30(2), 154-168. http://dx.doi.org/10.1080/21551197.2011.566527
59 Frith, E., & Loprinzi, P. D. (in press). Food insecurity and cognitive function in older adults: Brief report. Clinical Nutrition. https://doi.org/10.1016/j.clnu.2017.07.001
60 Mani, A., Mullainathan, S., Shafir, E., & Zhao, J. (2013). Poverty impedes cognitive function. Science, 341(6149), 976-980. http://doi.org/10.1126/science.1238041
61 Hooyman, N. R., Kawamoto, K. Y., & Kiyak, H. A. (2015). Aging matters. An introduction to social gerontology. United States of America: Pearson Education, Inc.
62 Torres-Gil, F. M. (1996). Malnutrition and hunger in the elderly. Nutrition reviews, 54(1), S7–S8. http://doi.org/10.1111/j.1753-4887.1996.tb03779.x
63 U.S. Government Accountability Office. (2015). Domestic food assistance: Multiple programs benefit millions of Americans, but additional action is needed to address potential overlap and inefficiencies, GAO-15-606T. http://www.gao.gov/assets/680/670313.pdf
64 Cook, J. T., & Poblacion, A. P. (2016). Appendix 2: Estimating the health-related costs of food insecurity and hunger. 2016 hunger report. Bread of the World Institute. Retrieved from http://www.bread.org/sites/default/files/downloads/cost_of_hunger_study.pdf
65 Dhurandhar, E. J. (2016). The food-insecurity obesity paradox: A resource scarcity hypothesis. Physiology & Behavior, 162, 88-92. https://doi.org/10.1016/j.physbeh.2016.04.025
66 Dinour, L. M., Bergen, D., & Yeh, M. C. (2007). The food insecurity–obesity paradox: a review of the literature and the role food stamps may play. Journal of the American Dietetic Association, 107(11), 1952-1961. https://doi.org/10.1016/j.jada.2007.08.006
67 Ahn, S., Smith, M. L, Hendricks, M., & Ory, M. (2014). Associations of food insecurity with body mass index among baby boomers and older adults. Food Security, 6(3), 423-433. http://doi.org/10.1007/s12571-014-0344-6
68 Duffy, P., Yamazaki, F., & Zizza, C. A. (2012). Can the dietary guidelines for Americans 2010 help trim America's waistline?. Choices, 27(1), 1-13. http://www.jstor.org/stable/pdf/choices.27.1.02.pdf
69 Porter, K. N., & Johnson, M. A. (2011). Obesity is more strongly associated with inappropriate eating behaviors than with mental health in older adults receiving congregate meals. Journal of Nutrition in Gerontology and Geriatrics, 30(4), 403-415. http://dx.doi.org/10.1080/21551197.2011.623960
70 Porter Starr, K, McDonald, S, & Bales, C (2015). Nutritional Vulnerability in Older Adults: A Continuum of Concerns. Retrived from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4445877/
71 Centers for Disease Control and Prevention. (2017). BRFSS Prevalence & Trends Data [data set], National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. https://www.cdc.gov/brfss/brfssprevalence/
72 U.S. Department of Health and Human Services & U.S. Department of Agriculture. (2015). 2015–2020 Dietary Guidelines for Americans. 8th Edition. Retrieved from http://health.gov/dietaryguidelines/2015/guidelines/
73 National Association of Area Agencies on Aging. Community Gardens and Senior Health. Retrieved from https://www.n4a.org/content.asp?contentid=430.
74 Mabli, J., & Ohls, J. (2015). Supplemental Nutrition Assistance Program participation is associated with an increase in household food security in a national evaluation. The Journal of Nutrition, 145(2), 344-351. http://jn.nutrition.org/content/145/2/344

75 Samuel, L. J., Szanton, S. L., Cahill, R., Wolff, J. L., Ong, P., Zielinskie, G., & Betley, C. (2017). Does the Supplemental Nutrition Assistance Program affect hospital utilization among older adults? The case of Maryland. Population Health Management. http://doi.org/10.1089/pop.2017.0055
76 Szanton, S. L., Samuel, L. J., Cahill, R., Zielinskie, G., Wolff, J. L., Thorpe, R. J., & Betley, C. (2017). Food assistance is associated with decreased nursing home admissions for Maryland's dually eligible older adults. BMC Geriatrics, 17(1), 162. http://doi.org/10.1186/s12877-017-0553-x
77 Moffitt, R. (1983). An economic model of welfare stigma. American Economic Review, 73(5), 1023–1035. http://www.jstor.org/stable/1814669
78 Center on Budget and Policy Priorities. (2017). Missouri Food Stamp Program. http://www.cbpp.org/sites/default/files/atoms/files/snap_factsheet_missouri.pdf
79 Tilly, J. (2017). Opportunities to Improve Nutirtion for Older Adults and Reduce Risk of Poor Health Outcomes. Administration for Community Living, Center for Policy and Evaluation. http://nutritionandaging.org/wp-content/uploads/2017/03/Malnutrition-Issue-Brief-final-3-2017.pdf
80 Feeding America. (2014). Hunger in America 2014: Executive summary. http://www.feedingamerica.org/hunger-in-america/our-research/hunger-in-america/hia-2014-executive-summary.pdf
81 MU Interdisciplinary Center for Food Security. (2014). Healthy shelves: Promoting and enhancing good nutrition in food pantries. http://foodsecurity.missouri.edu/wp-content/uploads/2015/01/Healthy-Shelves_Resource-Guide.pdf
82 Oberholser, C., & Tuttle, C. (2004). Assessment of household food security among food stamp recipient families in Maryland. American Journal of Public Health, 94(5), 790–795. https://doi.org/10.2105/AJPH.94.5.790
83 U.S. Department of Agriculture. (2016). Broad-Based Categorical Eligibility. Food and Nutrition Service. https://www.fns.usda.gov/sites/default/files/snap/BBCE.pdf
84 Supplemental Nutrition Assistance Program. (2015). Elderly simplified application project guidance. Washington, DC: USDA Food and Nutrition Service. https://fns-prod.azureedge.net/sites/default/files/snap/ESAP_Guidance.pdf
85 Benefits Data Trust & National Council on Aging. (2016). Strategies to simplify SNAP for seniors. https://www.ncoa.org/wp-content/uploads/ESAP-Cheat-Sheet.pdf
86 Food Stamp Program. (2005). Combined application projects: Guidance for states developing projects. USDA Food and Nutrition Service. www.fns.usda.gov/sites/default/files/CAPsDevelopmentGuidance.pdf
87 Dorn, S., Minton, S., & Huber, E. (2014). Examples of promising practices for integrating and coordinating eligibility, enrollment and retention: Human services and health programs under the Affordable Care Act. Urban Institute. https://aspe.hhs.gov/system/files/pdf/77016/rpt_PromissingPractices.pdf
88 Zielinskie, G., Samuel, L., Szanton, S., Betley, C., & Cahill, R. (2017). Policy research brief: Access to public benefits among dual eligible seniors reduces risk of nursing home and hospital admission and cuts costs. Benefits Data Trust. http://www.bdtrust.org/wp-content/uploads/2017/11/11.6.17-Policy-Brief.pdf
89 Food Stamp Program – Minimum Benefit – State Supplement: Fiscal and Policy Note, S. 758, Maryland General Assembly. (2016). http://mgaleg.maryland.gov/2016RS/fnotes/bil_0008/sb0758.pdf
90 Rosenbaum, D., Dean, S., Bolen, E., Wolkomir, E., Keith-Jennings, B., Cai, L., & Nchako, C. (2017). Administration's 2018 budget would severely weaken and cut the Supplemental Nutrition Assistance Program. Center on Budget and Policy Priorities. Retrieved from https://www.cbpp.org/sites/default/files/atoms/files/5-31-17fa.pdf
91 Dean, S. (2017). President's budget would shift substantial costs to states and cut food assistance for millions. Center on Budget and Policy Priorities. Retrieved from https://www.cbpp.org/sites/default/files/atoms/files/5-23-17fa.pdf
92 Ozarks Food Harvest. (2017, March). OFH receives extra CSFP food. Network News. Retrieved from https://issuu.com/ozarksfoodharvest/docs/network_news_march_2017
93 Sullivan, D., & Lipschultz, D. (1997). Evaluating and treating nutritional problems in older patients. Clinics in Geriatric Medicine, 13(4), 753-768. https://www.ncbi.nlm.nih.gov/pubmed/9354753
94 Blankenship, J. (2016). Malnutrition: the New Senior Crisis? The Academy of Nutrition and Dietetics. Retrieved from: http://nutritionandaging.org/wp-content/uploads/2016/09/Nutrition-Screening-Initiatives-DETERMINE-CHECKLIST-and-Senior-Malnutrition.pdf
95 Screening, Intervening, and Advocating to Address Food Insecurity, Resolution 17-05, New York County Chapter of New York State Academy of Family Physicians. (2017). http://www.nysafp.org/getmedia/5753641d-1633-49c1-9617-c4382b3b9840/17-05-Screening-Intervening-and-Advocating-to-Address-Food-Insecurity.aspx
96 Hager, E. R., Quigg, A. M., Black, M. M., Coleman, S. M., Heeren, T., Rose-Jacobs, R., ... & Cutts, D. B. (2010). Development and validity of a 2-item screen to identify families at risk for food insecurity. Pediatrics, 126(1), e26-e32. http://pediatrics.aappublications.org/content/126/1/e26
97 Laur, C., & Keller, H. (2017). Making the case for nutrition screening in older adults in primary care. Nutrition Today, 52(3), 129-136. https://doi.org/10.1097/NT.0000000000000218
98 Abd-El-Gawad, W. M., & Rasheedy, D. (2016). Chapter 6 – Nutrition in the hospitalized elderly. In M. Malavolta & E. Mocchegiani (Eds.), Molecular Basis of Nutrition and Aging. A Volume in the Molecular Nutrition Series (57-72). https://doi.org/10.1016/B978-0-12-801816-3.00006-6
99 Defeat Malnutrition Today. Malnutrition Quality Improvement Initiative. Retrived from: http://mqii.defeatmalnutrition.today/

100 Green, S. M., & Watson, R. (2006). Nutritional screening and assessment tools for older adults: literature review. Journal of Advanced Nursing, 54(4), 477-490. https://doi.org/10.1111/j.1365-2648.2006.03841.x
101 Vellas, B., Guigoz, Y., Garry, P. J., Nourhashemi, F., Bennahum, D., Lauque, S., & Albarede, J. L. (1999). The Mini Nutritional Assessment (MNA) and its use in grading the nutritional state of elderly patients. Nutrition, 15(2), 116-122. https://doi.org/10.1016/S0899-9007(98)00171-3
102 Vellas, B., Villars, H., Abellan, G., & Soto, M. E. (2006). Overview of the MNA®-its history and challenges/discussion. The Journal of Nutrition, Health & Aging, 10(6), 456-463. Retrieved from https://search.proquest.com/docview/222301728/
103 Wellman, N. S. (1994). The nutrition screening initiative. Nutrition Reviews, 52(8), 44-47. https://doi.org/10.1111/j.1753-4887.1994.tb01448.x
104 Posner, B. M., Jette, A. M., Smith, K. W., & Miller, D. R. (1993). Nutrition and health risks in the elderly: the nutrition screening initiative. American Journal of Public Health, 83(7), 972-978. https://doi.org/10.2105/AJPH.83.7.972
105 Sahyoun, N. R., Jacques, P. F., Dallal, G. E., & Russell, R. M. (1997). Nutrition Screening Initiative checklist may be a better awareness/educational tool than a screening one. Journal of the American Dietetic Association, 97(7), 760-764. https://doi.org/10.1016/S0002-8223(97)00188-0
106 Gruelling, H. (2016). The Nutrition Screening Initiative's DETERMINE CHECKLIST and Senior Malnutrition. The National Resource Center on Nutrition and Aging. Retrieved from: http://nutritionandaging.org/wp-content/uploads/2016/09/Nutrition-Screening-Initiatives-DETERMINE-CHECKLIST-and-Senior-Malnutrition.pdf
107 Stratton, R. J., Hackston, A., Longmore, D., Dixon, R., Price, S., Stroud, M., ... & Elia, M. (2004). Malnutrition in hospital outpatients and inpatients: prevalence, concurrent validity and ease of use of the 'malnutrition universal screening tool' ('MUST') for adults. British Journal of Nutrition, 92(5), 799-808. https://doi.org/10.1079/BJN20041258
108 Ferguson, M., Capra, S., Bauer, J., & Banks, M. (1999). Development of a valid and reliable malnutrition screening tool for adult acute hospital patients. Nutrition, 15(6), 458-464. https://doi.org/10.1016/S0899-9007(99)00084-2
109 Kruizenga, H. M., Seidell, J. C., De Vet, H. C. W., & Wierdsma, N. J. (2005). Development and validation of a hospital screening tool for malnutrition: the short nutritional assessment questionnaire (SNAQ©). Clinical Nutrition, 24(1), 75-82. https://doi.org/10.1016/j.clnu.2004.07.015
110 Kondrup, J., Allison, S. P., Elia, M., Vellas, B., & Plauth, M. (2003). ESPEN guidelines for nutrition screening 2002. Clinical nutrition, 22(4), 415-421. https://doi.org/10.1016/S0261-5614(03)00098-0
111 Rabito, E. I., Marcadenti, A., da Silva Fink, J., Figueira, L., & Silva, F. M. (2017). Nutritional Risk Screening 2002, Short Nutritional Assessment Questionnaire, Malnutrition Screening Tool, and Malnutrition Universal Screening Tool are good predictors of nutrition risk in an emergency service. Nutrition in Clinical Practice, 34(4), 526-532. https://doi.org/10.1177/0884533617692527
112 Chima, C. S., Barco, K., Dewitt, M. L., Maeda, M., Teran, J. C., & Mullen, K. D. (1997). Relationship of nutritional status to length of stay, hospital costs, and discharge status of patients hospitalized in the medicine service. Journal of the American Dietetic Association, 97(9), 975-978. https://doi.org/10.1016/S0002-8223(97)00235-6
113 Lim, S. L., Ong, K. C. B., Chan, Y. H., Loke, W. C., Ferguson, M., & Daniels, L. (2012). Malnutrition and its impact on cost of hospitalization, length of stay, readmission and 3-year mortality. Clinical Nutrition, 31(3), 345-350. https://doi.org/10.1016/j.clnu.2011.11.001
114 Corkins, M. R., Guenter, P., DiMaria-Ghalili, R. A., Jensen, G. L., Malone, A., Miller, S., ... & American Society for Parenteral and Enteral Nutrition. (2014). Malnutrition diagnoses in hospitalized patients: United States, 2010. Journal of Parenteral and Enteral Nutrition, 38(2), 186-195. https://doi.org/10.1177/0148607113512154
115 Sullivan, D. H. (1992). Risk factors for early hospital readmission in a select population of geriatric rehabilitation patients: the significance of nutritional status. Journal of the American Geriatrics Society, 40(8), 792-798. https://doi.org/10.1111/j.1532-5415.1992.tb01851.x
116 Thomas, D. R., Zdrowski, C. D., Wilson, M. M., Conright, K. C., Lewis, C., Tariq, S., & Morley, J. E. (2002). Malnutrition in subacute care. The American Journal of Clinical Nutrition, 75(2), 308-313. http://ajcn.nutrition.org/content/75/2/308
117 Friedmann, J. M., Jensen, G. L., Smiciklas-Wright, H., & McCamish, M. A. (1997). Predicting early nonelective hospital readmission in nutritionally compromised older adults. The American Journal of Clinical Nutrition, 65(6), 1714-1720. http://ajcn.nutrition.org/content/65/6/1714
118 Barker, L. A., Gout, B. S., & Crowe, T. C. (2011). Hospital malnutrition: prevalence, identification and impact on patients and the healthcare system. International Journal of Environmental Research and Public Health, 8(2), 514-527. https://doi.org/10.3390/ijerph8020514
119 National Research Council. (1989). Diet and health: Implications for reducing chronic disease risk. Washington, DC: National Academies Press. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/25032333
120 Lim, S. S., Vos, T., Flaxman, A. D., Danaei, G., Shibuya, K., Adair-Rohani, H., … & Aryee, M. (2012). A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. The Lancet, 380(9859), 2224-2260. https://doi.org/10.1016/S0140-6736(12)61766-8
121 Administration on Community Living. (n.d.). Nutrition services: Nutrition quality standards (OAA Section 339). Retrieved from https://www.acl.gov/programs/health-wellness/nutrition-services
122 Geisinger Fresh Food Farmacy. (2017). Fresh food farmacy. Retrieved from https://www.geisinger.org/freshfoodfarmacy

123 CBS News. (2017, June 20). Hospital's fresh food pharmacy program prescribes food instead of pills. https://www.cbsnews.com/news/fresh-food-pharmacy-program-prescribes-food-not-pills/
124 National Public Radio. (2017). Fresh food by prescription: This health care firm is trimming costs – and waistlines. Retrieved from http://www.npr.org/sections/thesalt/2017/05/08/526952657/fresh-food-by-prescription-this-health-care-firm-is-trimming-costs-and-waistline
125 Widener, M. J., Metcalf, S. S., & Bar-Yam, Y. (2012). Developing a mobile produce distribution system for low-income urban residents in food deserts. Journal of Urban Health, 89(5), 733-745. https://link.springer.com/article/10.1007/s11524-012-9677-7
126 St. Louis Metro Market. (n.d.). Metro market. Retrieved from https://www.stlmetromarket.com/
127 U.S. Department of Agriculture. (2017). Senior Farmers' Market Nutrition Program. Food and Nutrition Service. Retrieved from https://www.fns.usda.gov/sfmnp/overview
128 Missouri Senior Farmers' Market Nutrition Program, HB 1625, 99th General Assembly. (2018). Retrieved from https://house.mo.gov/Bill.aspx?bill=HB1625&year=2018&code=R
129 Centers for Disease Control and Prevention. (2013). State indicator report on fruits and vegetables, 2013. Atlanta, GA: Centers for Disease Control and Prevention, U.S. Department of Health and Human Services. https://www.cdc.gov/nutrition/downloads/State-Indicator-Report-Fruits-Vegetables-2013.pdf
130 NYC Health. (n.d.). NYC Green Carts. Retrieved from http://www1.nyc.gov/site/doh/health/health-topics/green-carts.page
131 Breck, A., Kiszko, K. M., Abrams, C., & Elbel, B. (2015). Spending at mobile fruit and vegetable carts and using SNAP benefits to pay, Bronx, New York, 2013 and 2014. Preventing Chronic Disease, 12, 140542. http://doi.org/10.5888/pcd12.140542
132 Breck, A., Kiszko, K., Martinez, O., Abrams, C., & Elbel, B. (2017). Could EBT machines increase fruit and vegetable purchases at New York City Green Carts?. Preventing Chronic Disease, 14, 170104. http://doi.org/10.5888/pcd14.170104
133 U.S. Department of Agriculture. (2017). Supplemental nutrition assistance program (SNAP): Online purchasing pilot. Food and Nutrition Service. Retrieved from https://www.fns.usda.gov/snap/online-purchasing-pilot
134 University of Missouri Extension. (2015). Gardener's Welcome Packet. Retrieved from https://extensiondata.missouri.edu/pub/pdf/miscpubs/mp0906.pdf
135 Interdisciplinary Center for Food Security. (2012). Grow Well Missouri: The garden starter. Department of Rural Sociology, Division of Applied Social Sciences, University of Missouri. http://foodsecurity.missouri.edu/wp-content/uploads/2017/05/GARDENSTARTER-final-package.pdf
136 University of Missouri Extension. (n.d.). Family Nutrition Education Programs. Retrieved from http://extension.missouri.edu/fnep/
137 U.S. Department of Agriculture. (2012). Supplemental Nutrition Assistance Program: Education (SNAP-Ed) facts. Food and Nutrition Service. Retrieved from https://snaped.fns.usda.gov/snap/SNAP-EdFactsheet2012.pdf
138 Share Our Strength (2011). Introducing Shopping Matters®, a new grocery store tour focused on health and savings. No Kid Hungry, Cooking Matters. Retrieved from https://www.nokidhungry.org/blog/cooking-matters/2011/10/introducing-shopping-matters%C2%AE-new-grocery-store-tour-focused-health-and-savings
139 Share Our Strength. (n.d.). Cooking Matters: Healthy, affordable, delicious. No Kid Hungry. Retrieved from https://cookingmatters.org/
140 Gunders, D. (2012). Wasted: How America is losing up to 40 percent of its food from farm to fork to landfill, IP: 12-06-B. National Resources Defense Council. Retrieved from http://www.nrdc.org/food/files/wasted-food-ip.pdf
141 National Foundation to End Senior Hunger. (n. d.). What a Waste: Two problems, one solution. Retrieved from https://www.nfesh.org/what-a-waste/two-problems/
142 U.S. Department of Agriculture. (2013, June). U.S. food waste challenge, FAQs. Office of the Chief Economist. Retrieved from http://www.usda.gov/oce/foodwaste/faqs.htm
143 Natural Resources Defense Council & Harvard Food Law and Policy Clinic. (2013). The dating game: How confusing food date labels lead to food waste in America. NRDC Report, R: 13-09-A. Retrieved from https://www.nrdc.org/sites/default/files/dating-game-report.pdf
144 Ganglbauer, E., Molzer, G., & Fischer, C. (n.d.). Food Waste Diary. Retrieved from https://igw.tuwien.ac.at/foodwastediary/info/English.html
145 Environmental Protection Agency. (n.d.) Sustainable management of food, tools for preventing and diverting wasted food: Food waste management cost calculator. Retrieved from https://www.epa.gov/sustainable-management-food/tools-preventing-and-diverting-wasted-food
146 Spinning Meals. (n.d.) Spinning Meals smart meal planner. Retrieved from http://spinningmeals.com/
147 Handpick, Inc. (2017). Our Meal Kits. Retrieved from https://handpick.com/
148 National Foundation to End Senior Hunger. (2017). What a WasteTM. Retrieved from https://www.nfesh.org/what-a-waste/
149 Ver Ploeg, M., Breneman, V., Farrigan, T., Hamrick, K., Hopkins, D., Kaufman, P., … & Kim, S. (2009). Access to affordable and nutritious food: Measuring and understanding food deserts and their consequences – Report to Congress. Washington, DC: U.S. Department of Agriculture, Economic Research Service. https://www.ers.usda.gov/webdocs/publications/42711/12716_ap036_1_.pdf
150 Cannuscio, C. C., Hillier, A., Karpyn, A., & Glanz, K. (2014). The social dynamics of healthy food shopping and store choice in an urban environment. Social Science & Medicine, 122, 13-20. https://doi.org/10.1016/j.socscimed.2014.10.005

151 DiSantis, K. I., Hillier, A., Holaday, R., & Kumanyika, S. (2016). Why do you shop there? A mixed methods study mapping household food shopping patterns onto weekly routines of black women. International Journal of Behavioral Nutrition and Physical Activity, 13(1), 11. https://doi.org/10.1186/s12966-016-0333-6
152 Hillier, A., Cannuscio, C. C., Karpyn, A., McLaughlin, J., Chilton, M., & Glanz, K. (2011). How far do low-income parents travel to shop for food? Empirical evidence from two urban neighborhoods. Urban Geography, 32(5), 712-729. http://dx.doi.org/10.2747/0272-3638.32.5.712
153 Uber Technologies, Inc. (2017). Ride with Uber. Retrieved from https://www.uber.com/ride/
154 Lyft, Inc. (2017). Lyft: A ride whenever you need one. Retrieved from https://www.lyft.com/
155 Wai, T.C., Gallo, W.T., Giunta, N., Canavan, M.E., Parikh, N.S., & Fahs, M.C. (2011). Linking neighborhood characteristics to food insecurity in older adults: The role of perceived safety, social cohesion, and walkability. Journal of Urban Health: Bulletin of the New York Academy of Medicine, 89(3), 407-418. http://doi.org/10.1007/s11524-011-9633-y
156 Dutko, P., Ver Ploeg, M., & Farrigan, T. (2012). Characteristics and influential factors of food deserts, ERR-140. USDA Economic Research Service. https://www.ers.usda.gov/webdocs/publications/45014/30940_err140.pdf
157 Dutko, P. (2012). Food deserts suffer persistent socioeconomic disadvantage. Choices, 27(3), 153-176. http://www.jstor.org/stable/choices.27.3.02
158 Dannefer, R., Williams, D. A., Baronberg, S., & Silver, L. (2012). Healthy bodegas: Increasing and promoting healthy foods at corner stores in New York City. American Journal of Public Health, 102(10), e27-e31. http://doi.org/10.2105/AJPH.2011.300615
159 Ver Ploeg, M. & Rahkovsky, I. (2016). Recent evidence on the effects of food store access on food choice and diet quality. USDA Economic Research Service, Amber Waves. https://www.ers.usda.gov/amber-waves/2016/may/recent-evidence-on-the-effects-of-food-store-access-on-food-choice-and-diet-quality/
160 U.S. Department of Housing and Urban Development. (n.d.) Community Development Block Grant Program – CDBG. Retrieved from https://www.hud.gov/program_offices/comm_planning/communitydevelopment/programs
161 Babu, S., Gajanan, S. N., & Sanyal, P. (2014). Food security, poverty and nutrition policy analysis: statistical methods and applications (2nd ed.). Academic Press: Waltham, MA. https://www.elsevier.com/books/food-security-poverty-and-nutrition-policy-analysis/babu/978-0-12-405864-4
162 Chen, X., & Clark, J. (2016). Measuring space–time access to food retailers: a case of temporal access disparity in Franklin County, Ohio. The Professional Geographer, 68(2), 175-188. http://dx.doi.org/10.1080/00330124.2015.1032876
163 Rose, D., Bodor, J. N., Hutchinson, P. L., & Swalm, C. M. (2010). The importance of a multi-dimensional approach for studying the links between food access and consumption .Journal of Nutrition, 140(6), 1170-1174. http://doi.org/10.3945/jn.109.113159
164 Modifies provisions relating to infection reporting of health care facilities and telehealth services, SB 579, 98th General Assembly. (2016). Retrieved from https://legiscan.com/MO/text/SB579/id/1398351/Missouri-2016-SB579-Enrolled.pdf
165 Harbison, G. (2017, May 25). Using new tech to increase dental care access. Health Care Foundation of Greater Kansas City. Retrieved from https://hcfgkc.org/using-new-tech-increase-dental-care-access/
166 Thomas, K. S. (2014). The relationship between Older Americans Act in-home services and low-care residents in nursing homes. Journal of Aging and Health, 26(2), 250-260. http://doi.org/10.1177/0898264313513611
167 Grandfamilies.org. (2017, May). Grandfacts: Missouri state fact sheet for grandfamilies. Retrieved from http://www.grandfamilies.org/Portals/0/State%20Fact%20Sheets/Grandfamilies-Fact-Sheet-Missouri.pdf
168 Hwang, W., Weller, W., Ireys, H., & Anderson, G. (2001). Out-of-pocket medical spending for care of chronic conditions. Health Affairs, 20(6), 267-278. http://doi.org/10.1377/hlthaff.20.6.267
169 MO Department of Social Services. (n.d.). Frequently asked questions: MORx, general questions. Retrieved from https://dss.mo.gov/mhd/faq/pages/faqmo_rx.htm
170 U.S. Department of Labor Statistics. (2016). Labor force statistics from the Current Population Survey [Data set]. Household data annual averages: Employment status of the civilian noninstitutional population by age, sex, and race. https://www.bls.gov/cps/cpsaat03.pdf
171 Social Security Administration. (2017). Understanding the Benefits. Publication no. 05-10024. Retrieved from https://www.ssa.gov/pubs/EN-05-10024.pdf
172 Fox, L. (2017). The supplemental poverty measure: 2016 - Current population reports. U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau. https://www.census.gov/content/dam/Census/library/publications/2017/demo/p60-261.pdf
173 Johnson, M. (2017). Social Security benefits lose 30% of buying power since 2000: 2017 loss of buying power study. The Senior Citizens League. Retrieved from http://seniorsleague.org/assets/2017-LOBP-Report-52617.pdf
174 MO Department of Health and Senior Services. (n.d.). Senior Employment. Retrieved from http://health.mo.gov/seniors/seniorемployment/
175 Lusari, A. & de Bassa Scheresberg, C. (2016). Enhancing retirement savings with school-based financial education. National Endowment of Financial Education. https://nefe.org/Portals/0/WhatWeProvide/PrimaryResearch/PDF/NEFE%20Final%20Report.pdf
176 Saving Matters. (n.d.). Retirement Savings Education Campaign: Saving Matters. U.S. Department of Labor. Retrieved from https://www.savingmatters.dol.gov/

177 National Council on Aging. (n.d.). Savvy Saving Seniors® Financial Education Tools. Retrieved from https://www.ncoa.org/economic-security/money-management/budgeting/savvy-saving-seniors-financial-education/
178 Carlson, S. J., Andrews, M. S., & Bickel, G. W. (1999). Measuring food insecurity and hunger in the United States: Development of a national benchmark measure and prevalence estimates. The Journal of Nutrition, 129(2), 510S-516S. http://jn.nutrition.org/content/129/2/510S.short
179 Frongillo, E. A. (1999). Validation of measures of food insecurity and hunger. The Journal of Nutrition, 129(2), 506S-509S. http://jn.nutrition.org/content/129/2/506S
180 Gundersen, C. & Ribar, D. C. (2005). Food insecurity and insufficiency at low levels of food expenditures. IZA Discussion Paper Series, 1594. https://ssrn.com/abstract=725445
181 Gundersen, C. & Ribar, D. C. (2011). Food insecurity and insufficiency at low levels of food expenditures. Review of Income and Wealth, 57(4), 704-726. http://doi.org/10.1111/j.1475-4991.2011.00471.x

Appendix

How Does the Current Population Survey Measure Up?

There are several advantages to the method of using the Current Population Survey (CPS) to collect food security data. One important advantage is its widespread acceptance as an authoritative source of statistical information.[16] A second is its large sample size of about 50,000 households and its state-level representative sample, which allows researchers to get reliable estimates of prevalence in subpopulations of interest at a moderate cost. A third advantage is the timeliness of the reporting of data, which is released annually. Other considerations also include its notable sample design, data collection and quality control procedures, and assured consistency and regularity of collection.[178] All of these features allow for the inclusion of a representative sample of households and a reliable annual dataset.

There are also other advantages of the current method. For one, there is strong evidence that the Food Security Survey (FSS) provides an internally valid measurement of food insecurity and hunger in the population. As an example, Frongillo[179] concludes that the construction of FSS is well-grounded in an understanding of food insecurity and hunger; its performance is consistent with that understanding; it is precise within usual performance standards, dependable, and accurate at both group and individual levels within reasonable performance standards; and its accuracy is attributable to the well-grounded understanding. Based on these features, he concludes that the survey can be used validly to identify household food insecurity and hunger and to target specific populations for food programs. However, he adds the caveat that further validation research may be needed for specific subgroups of the population who have not yet been studied for validation purposes.

Even though using the CPS household survey has many distinct advantages, it also has several significant disadvantages. First, it is considered a survey of households, but only one individual is surveyed, so the respondents' reports of food insecurity serve as a proxy for household levels of food insecurity. Regardless, however, it is possible for food insecurity to be unevenly distributed within households and this design does not allow these types of household variations to be detected. Additionally, one inherent concern for self-reported measures is that respondents may under-report food insecurity. For instance, there may be variations in reporting based on the respondents' subjective notions regarding appropriate food standards and thus, varying thresholds for food insecurity[180]; some subjects may be uncomfortable admitting potentially embarrassing information[181]; and lastly, some households may be using more adaptive coping strategies to deal with their circumstances. Regrettably, all of these concerns limit the validity and generalizability of the collected data.

Another drawback of the survey is the restricted categorization of food security status. Consider the example offered by Gundersen and Ribar[181] where two households are classified as very low for food security even though one responded affirmatively to eight questions and the other responded affirmatively to all 18 questions. Arguably, the latter household has a higher level of food insecurity, but this degree of severity is not captured in the current categorization method. Such a limitation diminishes the sensitivity of the measure and restricts the ability to detect finer variabilities in the data.

Although the length of the CPS survey is reasonable, another disadvantage is that it does not ask all the relevant questions pertaining to food insecurity. For example, the CPS collects no information on family assets or food expenditures aside from whether or not families own their home or receive Food Stamps (along with the dollar value of Food Stamps).[26] Food expenditure is an important consideration because wealth may offer a protective buffer against hunger over and above income as families can use savings to cover necessities such as food in the event of a negative shock to income or health. Another disadvantage is that the frequency of food insecurity and the duration of spells of insecurity are not directly assessed in the Household Food Security Survey Module questions.[16] Although some of the response options do offer choices between "often, sometimes,

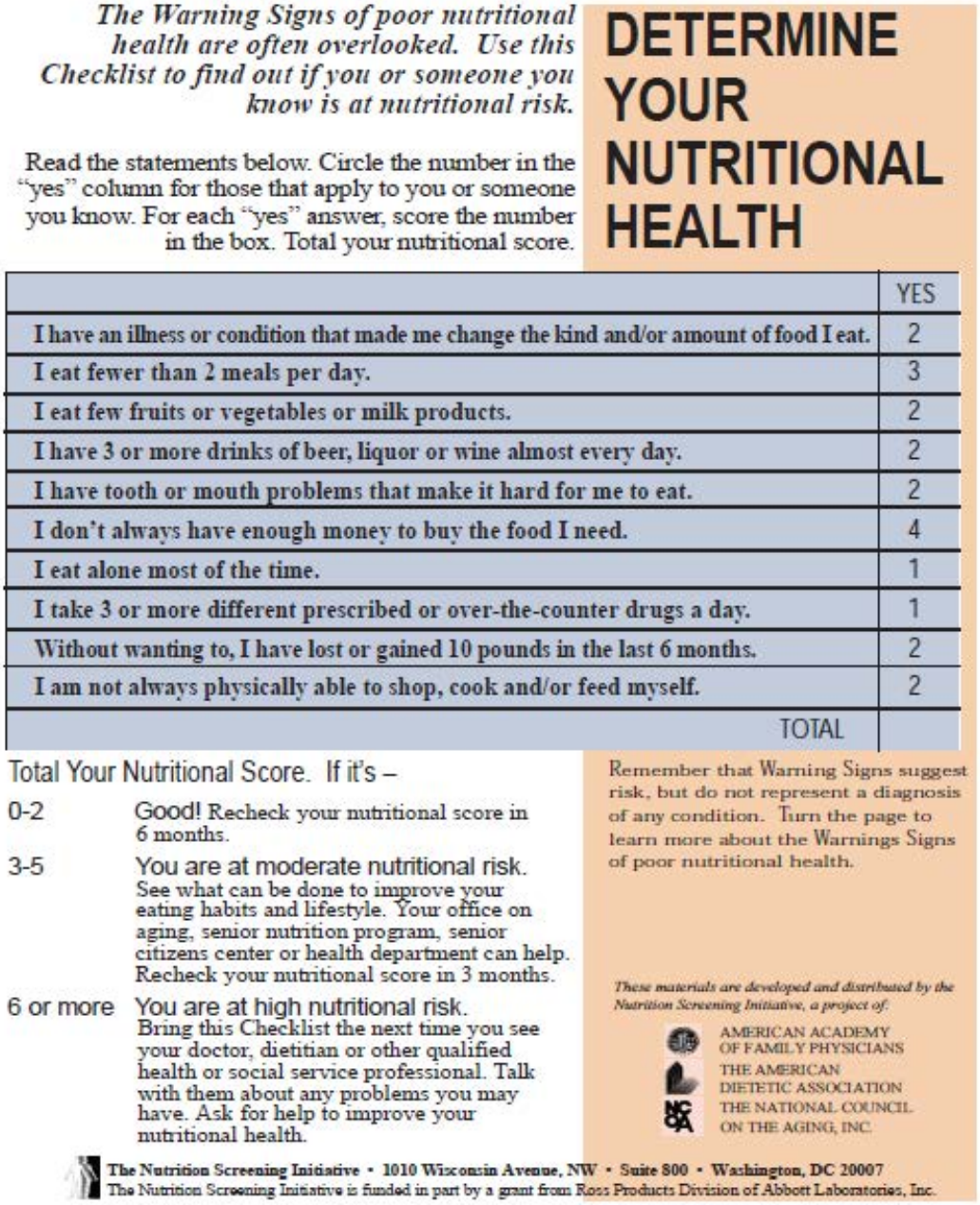
or never," these response options are not sufficient measures of frequency, and no distinctions are made between scoring "often" and "sometimes" responses. Also, as briefly mentioned previously, the survey does not consider food safety or food variety and does not measure social acceptability in obtaining food.[181] Including additional questions may allow for new insight into food insecurity, but would also drastically increase the cost and the amount of time it takes to administer the survey.

Prominent researchers in the field have highlighted a few additional criticisms of the CPS survey in the literature. Some analysts suggest a degree of arbitrariness in which the thresholds for different levels of food insecurity are set.[181] Others have pointed out that the CPS sample does not include homeless populations (who are not in shelters), in which food insecurity prevalence is likely very high; consequently, this is another reason food insecurity rates are probably currently underestimated.[16] Lastly, although the scale has been shown to have strong internal validity, its external validity has been questioned. Gundersen and Ribar[181] shed light on their unexpected finding that households with very low food expenditures under-report food insecurity and suggest the low frequency of food insecurity in this group may be due to a social-desirability bias, where subjects are uncomfortable reporting potentially embarrassing information. Although the FSS data does not allow researchers to investigate this explanation further, the authors conclude that the data may be masking genuine distress among disadvantaged households. The survey may also be insensitive to increases in well-being due to policy innovations and economic improvements.[181] These are all significant issues to keep in mind when reviewing the data and analyses the USDA releases.

Available Screening Tools for Malnutrition and Senior Hunger

DETERMINE Nutrition Screening

This checklist helps identify whether someone is at nutritional risk. It can be taken by the individual, or by someone that knows them. More information about DETERMINE can be found at: http://nutritionandaging.org/wp-content/uploads/2017/01/DetermineNutritionChecklist.pdf.



The Warning Signs of poor nutritional health are often overlooked. Use this Checklist to find out if you or someone you know is at nutritional risk.

Read the statements below. Circle the number in the "yes" column for those that apply to you or someone you know. For each "yes" answer, score the number in the box. Total your nutritional score.

DETERMINE YOUR NUTRITIONAL HEALTH

	YES
I have an illness or condition that made me change the kind and/or amount of food I eat.	2
I eat fewer than 2 meals per day.	3
I eat few fruits or vegetables or milk products.	2
I have 3 or more drinks of beer, liquor or wine almost every day.	2
I have tooth or mouth problems that make it hard for me to eat.	2
I don't always have enough money to buy the food I need.	4
I eat alone most of the time.	1
I take 3 or more different prescribed or over-the-counter drugs a day.	1
Without wanting to, I have lost or gained 10 pounds in the last 6 months.	2
I am not always physically able to shop, cook and/or feed myself.	2
TOTAL	

Total Your Nutritional Score. If it's –

0-2 Good! Recheck your nutritional score in 6 months.

3-5 You are at moderate nutritional risk. See what can be done to improve your eating habits and lifestyle. Your office on aging, senior nutrition program, senior citizens center or health department can help. Recheck your nutritional score in 3 months.

6 or more You are at high nutritional risk. Bring this Checklist the next time you see your doctor, dietitian or other qualified health or social service professional. Talk with them about any problems you may have. Ask for help to improve your nutritional health.

Remember that Warning Signs suggest risk, but do not represent a diagnosis of any condition. Turn the page to learn more about the Warnings Signs of poor nutritional health.

These materials are developed and distributed by the Nutrition Screening Initiative, a project of:

AMERICAN ACADEMY OF FAMILY PHYSICIANS
THE AMERICAN DIETETIC ASSOCIATION
THE NATIONAL COUNCIL ON THE AGING, INC.

The Nutrition Screening Initiative • 1010 Wisconsin Avenue, NW • Suite 800 • Washington, DC 20007
The Nutrition Screening Initiative is funded in part by a grant from Ross Products Division of Abbott Laboratories, Inc.

Malnutrition Screening Tool (MST)

This tool is used to screen patients for risk of malnutrition and is suitable for use in in-patient/out-patient hospital setting. Screening parameters include weight loss and appetite.

alliance to Advance Patient Nutrition | Malnutrition Screening Tool (MST)

STEP 1: Screen with the MST

1 Have you recently lost weight without trying?

No	0
Unsure	2

If yes, how much weight have you lost?

2-13 lb	1
14-23 lb	2
24-33 lb	3
34 lb or more	4
Unsure	2

Weight loss score: _____

2 Have you been eating poorly because of a decreased appetite?

No	0
Yes	1

Appetite score: _____

Add weight loss and appetite scores

MST SCORE: _____

STEP 2: Score to determine risk

MST = 0 OR 1
NOT AT RISK
Eating well with little or no weight loss

If length of stay exceeds 7 days, then rescreen, repeating weekly as needed.

MST = 2 OR MORE
AT RISK
Eating poorly and/or recent weight loss

Rapidly implement nutrition interventions. Perform nutrition consult within 24-72 hrs, depending on risk.

STEP 3: Intervene with nutrition for your patients at risk of malnutrition.

Notes: _____

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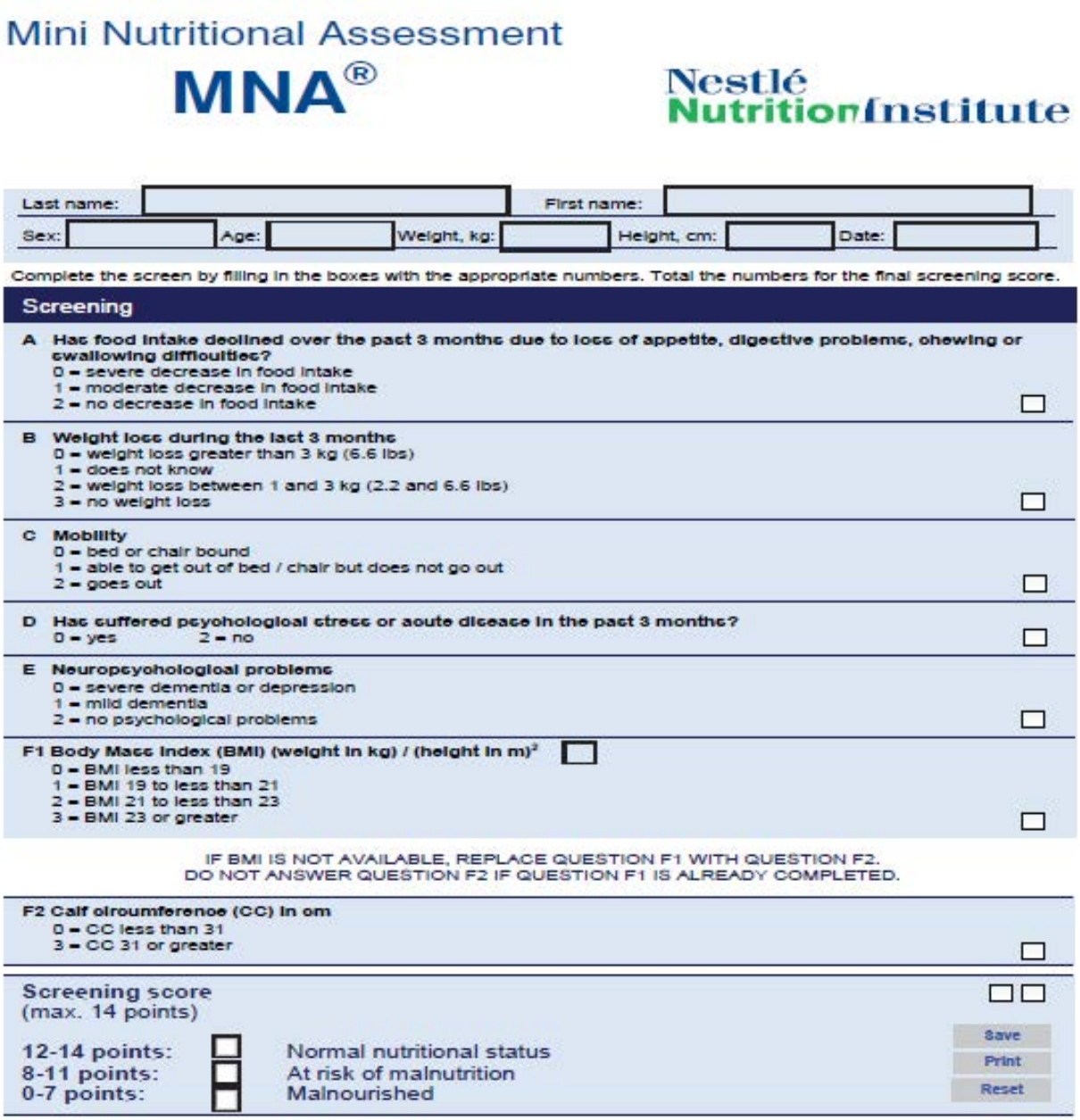
These health organizations are dedicated to the education of effective hospital nutrition practices to help improve patients' medical outcomes and support all clinicians in collaborating on hospital-wide nutrition procedures. The Alliance to Advance Patient Nutrition is made possible with support from Abbott Nutrition.

Mini Nutritional Assessment (MNA)

This is a quick and easy tool that takes less than five minutes to complete.



Mini Nutritional Assessment

MNA®

Nestlé Nutrition Institute

Last name: First name:

Sex: Age: Weight, kg: Height, cm: Date:

Complete the screen by filling in the boxes with the appropriate numbers. Total the numbers for the final screening score.

Screening

A Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?
0 = severe decrease in food intake
1 = moderate decrease in food intake
2 = no decrease in food intake

B Weight loss during the last 3 months
0 = weight loss greater than 3 kg (6.6 lbs)
1 = does not know
2 = weight loss between 1 and 3 kg (2.2 and 6.6 lbs)
3 = no weight loss

C Mobility
0 = bed or chair bound
1 = able to get out of bed / chair but does not go out
2 = goes out

D Has suffered psychological stress or acute disease in the past 3 months?
0 = yes 2 = no

E Neuropsychological problems
0 = severe dementia or depression
1 = mild dementia
2 = no psychological problems

F1 Body Mass Index (BMI) (weight in kg) / (height in m)²
0 = BMI less than 19
1 = BMI 19 to less than 21
2 = BMI 21 to less than 23
3 = BMI 23 or greater

IF BMI IS NOT AVAILABLE, REPLACE QUESTION F1 WITH QUESTION F2.
DO NOT ANSWER QUESTION F2 IF QUESTION F1 IS ALREADY COMPLETED.

F2 Calf circumference (CC) in cm
0 = CC less than 31
3 = CC 31 or greater

Screening score
(max. 14 points)

12-14 points: Normal nutritional status
8-11 points: At risk of malnutrition
0-7 points: Malnourished

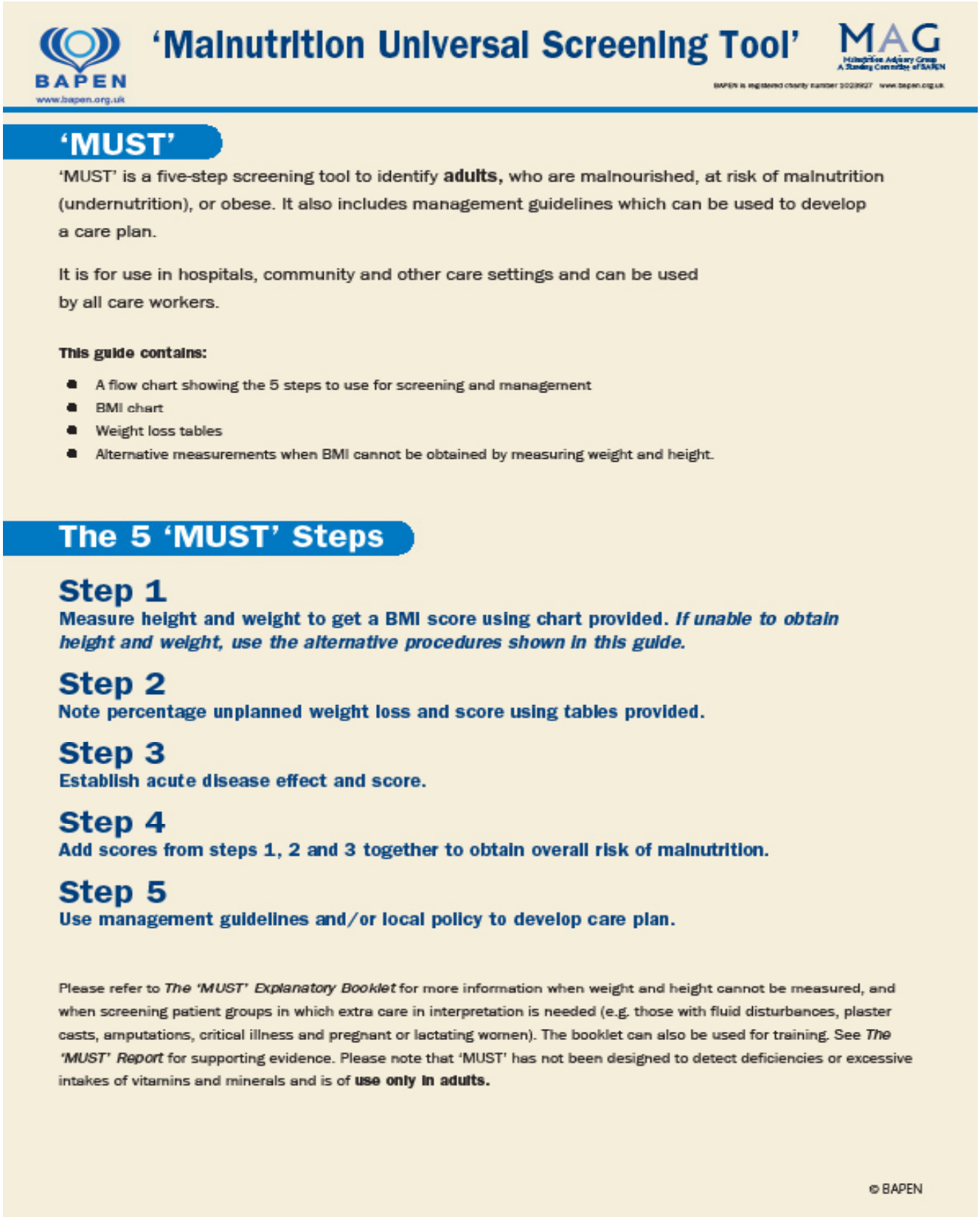
Save Print Reset

Ref. Vellas B. Villars H. Abellan G. et al. *Overview of the MNA® - Its History and Challenges.* J Nutr Health Aging 2006;10:456-465.
Rubenstein LZ. Harker JO. Salva A. Guigoz Y. Vellas B. *Screening for Undernutrition in Geriatric Practice: Developing the short-Form Mini Nutritional Assessment (MNA-SF).* J. Geront 2001:56A: M366-377.
Guigoz Y. *The Mini-Nutritional Assessment (MNA®) review of the Literature - What does it tell us?* J Nutr Health Aging 2006; 10:466-487.
Kaiser MJ. Bauer JM. Ramsch C. et al. *Validation of the Mini Nutritional Assessment short-Form (MNA®-SF): A practical tool for identification of nutritional status.* J Nutr Health Aging 2009; 13:782-788.

For more information: www.mna-elderly.com

Malnutrition Universal Screening Tool (MUST)

A validated screening tool for adults in acute and community settings. Additional toolkit items can be found at: http://www.bapen.org.uk/screening-and-must/must/must-toolkit/the-must-itself.



BAPEN
www.bapen.org.uk

'Malnutrition Universal Screening Tool'

MAG
Malnutrition Advisory Group
A Standing Committee of BAPEN

BAPEN is registered charity number 1023927 www.bapen.org.uk

'MUST'

'MUST' is a five-step screening tool to identify **adults,** who are malnourished, at risk of malnutrition (undernutrition), or obese. It also includes management guidelines which can be used to develop a care plan.

It is for use in hospitals, community and other care settings and can be used by all care workers.

This guide contains:

- A flow chart showing the 5 steps to use for screening and management
- BMI chart
- Weight loss tables
- Alternative measurements when BMI cannot be obtained by measuring weight and height.

The 5 'MUST' Steps

Step 1

Measure height and weight to get a BMI score using chart provided. *If unable to obtain height and weight, use the alternative procedures shown in this guide.*

Step 2

Note percentage unplanned weight loss and score using tables provided.

Step 3

Establish acute disease effect and score.

Step 4

Add scores from steps 1, 2 and 3 together to obtain overall risk of malnutrition.

Step 5

Use management guidelines and/or local policy to develop care plan.

Please refer to *The 'MUST' Explanatory Booklet* for more information when weight and height cannot be measured, and when screening patient groups in which extra care in interpretation is needed (e.g. those with fluid disturbances, plaster casts, amputations, critical illness and pregnant or lactating women). The booklet can also be used for training. See *The 'MUST' Report* for supporting evidence. Please note that 'MUST' has not been designed to detect deficiencies or excessive intakes of vitamins and minerals and is of **use only in adults.**

Nutrition Risk Screening (NRS-2002)

An assessment of recent weight loss (%), recent intake, BMI, severity of disease, and age. More information about the NRS-2002 can be found at: http://espen.info/documents/screening.pdf.

Screening for Nutritional Deficiency in the Hospital

Nutritional Risk Screening (NRS 2002)

from Kondrup J et al., Clinical Nutrition 2003; 22: 415-421

Recommended by the European Society for Clinical Nutrition and Metabolism (ESPEN)

Prescreening

•Is the body mass index <20.5 kg/m²?	❑ Yes ❑ No
•Has the patient lost weight in the previous 3 months?	❑ Yes ❑ No
•Was nutritional intake reduced in the previous week?	❑ Yes ❑ No
•Is the patient very ill? (e.g. in intensive care)	❑ Yes ❑ No

⇨ If any of these questions is answered Yes, continue with the main screening.

⇨ If all questions are answered No, the patient will be screened again weekly.

⇨ If major surgery, for example, is planned for the patient, a preventive nutritional plan should be instituted to prevent the associated risk.

Main Screening

Nutritional disorder	Points
None	0
Mild Weight loss >5%/3 mo. or nutritional intake <50–75% of required nutritional intake in the previous week	1
Moderate Weight loss >5%/2 mo. or BMI 18.5–20.5 kg/m² and reduced general condition (GC) or nutritional intake 25–50% of required nutritional intake in the previous week	2
Severe Weight loss >5%/1 mo. (>15%/3 mo.) or BMI <18.5 kg/m² and reduced general condition or nutritional intake 0–25% of required nutritional intake in the previous week	3

+

Illness severity	Points
None	0
Mild e.g. femoral neck fracture, chronic disease especially if complications are present: liver cirrhosis, chronic obstructive lung disease, chronic hemodialysis, diabetes, cancer	1
Moderate e.g. major abdominal surgery, stroke, severe pneumonia, hematologic cancers	2
Severe e.g. head injury, bone marrow transplantation, patients in intensive care (APACHE-II >10)	3

\+ 1 point, if age ≥70 years

≥3 points	Nutritional risk present, preparation of a nutritional plan
<3 points	Screening repeated weekly. If major surgery, for example, is planned for the patient, a preventive nutritional plan should be instituted to prevent the associated risk.

Acknowledgments

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